

THE
BRITISH PALLADIUM:

O R

Annual Miscellany of Literature and Science,

For the YEAR 1778.

THE THIRTIETH NUMBER PUBLISHED.

In TWO PARTS.

The FIRST containing NOTES, MEMORANDUMS,
OBSERVATIONS, and TABLES for the YEAR:

With interesting SUBJECTS annexed, viz.

The Principles and Rudiments of GEOGRAPHY continued;
or, a Natural and Historical ACCOUNT of our
Terraqueous GLOBE.

The SECOND comprehending ANSWERS to *Queries* and
Enquiries in the former YEAR's PALLADIUM:

With new QUERIES and ENQUIRIES (*Natural, Historical,
Geographical, Classical, Poetical, Arithmetical,
Analytical, Philosophical, and Mathematical*) for the
present YEAR.

For general Use and Improvement of BOTH SEXES.

Particularly useful in Schools and Academies, and in Navigation.

By THE PALLADIUM AUTHOR.



BRITANNIA now, in *regal* Pomp array'd,
Commands the *Ocean*, and protects our *Trade*:
While she asserts her *Empire* o'er the *Main*,
Her *Foes* defeated, their Attempts how vain!

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OBSERVATIONS on the WISDOM of CREATION.

Omnia plena Jovis. VIRG.

1. **H**OW wonderful is *Generation* in all the various Species of Animals, but how much more wonderful is the *original Creation* of each separate and distinct organized and animate Species, before *Generation*, in Succession, begun!

2. What divine *Energy*, Wisdom, and Power is seen in the *Formation* and Organization of each Animal, before *Generation*, in Succession, could take place!

3. The particular Forms, in the Extent of Creation of *animate* and *inanimate* Beings, how wonderful!

4. How wonderful are the *existing Forms*, in Creation, determined and limited as they are, by the infinite and allpowerful Creator!

5. That no other Forms, of *animate* and *inanimate* Beings, are admitted into the infinite Extent of Creation than those which now exist, how wonderful!

6. The *subordinate Scale* of different *Animal Beings* how wonderful!

7. By which *Subordination* of *inferior* Beings (the *Objects* of our Sense) a Scale of superior and subordinate Beings is *inferred*, from the HIGHEST to the Lowest Order of created Beings.

8. The *Substance*, *Complexity*, *Connection*, and *Subserviency* of each Part of every Animal, ministering to the Support and Benefit of the Whole, and the whole ministering to the Support and Benefit of each Part, how wonderful!

9. The *curious Texture* of the *Brain*, of the *Medulla Spinalis*, and *Nerves* issuing therefrom, as the intellectual Fountain, and distributive Organs of Sensation, spread through the Substance of the whole animal *Fabric* of Man, and of each living *Being*, how astonishing to human Thought! How soon the smallest Injury to the Brain, or *Spinal Marrow* (guarded by a Case of Bone at the Head, Joints at the Back, of curious Construction) destroys the whole infinite *Animal Machine*!

10. The *Nutrition*, *Support*, and *Preservation* of the whole Animal Species, by Circulation of different Fluids, thro' all the Parts of each generated Animal, and animal Species, how wonderful!

11. How wonderful the *Structure* of each Animal (formed by infinite *Wisdom* and *Design*) constituted of various Substances, and distinct Parts!

12. In the larger and smaller Animals, *Bones* are formed for Props, *Muscles* for Levers, and *Limbs* for Motion and Strength of the Body; *Arteries* and *Veins* for conveying and reconveying Circulation; *Glands* (simple and compounded) for Secretion and Separation of different Fluids; and *Lymphaducts*, for Conveyance of *Nutriments*; formed in different Animals, from One uniform Substance of Food.

13. The same uniform Food, by *Digestion*, *Transmutation*, and *Circulation*, is formed into Nourishment and Support for all the different Parts and Substances of each Animal Body.

14. Some Part, separated from the Food, sustains the Bones, Sinews, and Ligaments; other Part sustains the Muscles, and *Synovia* Liquid for moving the Joints; other Part, the Nerves, Arteries, Veins, and glandular Substance. These again are sustained by a Circulation of Fluids thro' them, adapted for their Support, thro' the whole complicated Series of circulatory Canals, and modified Construction of the organized Parts throughout every animated Machine, the Sagacity and Wisdom, in the Contrivance of each Animal, is beyond human Thought to conceive.

(Continued, see Page 11.)

A NEW GUIDE to the YEAR 1778.

PART I.

To find the Day of the Month from the Day of the Week, and the Day of the Week from the Month-Day.

Against each Month of the Year, to the Right Hand, stand the seven Week-Days, above which stand all the Month-Days in that Month, answering to each Week-Day.

Contrarily, Under any Month-Day stands the Week-Day against that Month, at the Angle of Meeting.

MONTHS of the YEAR.			MONTH-DAYS, and WEEK-DAYS.						
January.	February.	March.	April.	May.	June.	August.	September.	October.	December.
Th	Su	Mo	We	Fr	Mo	Sa	Tu	Fr	Mo
Fr	Mo	Tu	Th	Sa	Tu	Th	We	Sa	Tu
Sa	Tu	We	Fr	Mo	We	Fr	Th	Mo	We
Mo	We	Th	Sa	Tu	Th	Sa	Fr	Tu	Th
Tu	Th	Fr	Mo	We	Fr	Mo	Sa	Th	Fr
We	Fr	Mo	Tu	Th	Sa	Tu	Th	Mo	We
Th	Mo	Tu	We	Fr	Mo	We	Th	Tu	Th
Fr	Tu	We	Th	Sa	Tu	Th	Fr	We	Fr
Sa	We	Th	Fr	Mo	Th	Fr	Mo	We	Sa

For Construction of the above Table, see p. 2, *Palladium*, 1763.

EXAMPLE I. To find the Day of the Month answering to the first Sunday in January 1778.

To the Right Hand of January you find Sunday; directly above which in the Columns among the Month-Days, stand 4, 11, 18, 25, answering to all the Sundays in January: therefore the first Sunday is the 4th Day, required. So for other like Cases.

EXAMPLE II. To find the Day of the Week on which the 24th Day of May happens 1778.

Under 24, the Month-Day, against May, at the Angle where the upper and side Columns meet, stands Su, or Sunday, required.

NOTES for 1778.		MOVEABLE FEASTS.		SUN RISES.				EXAMPLES.	
Dom. Let. N. S. D	Feb. 15. Septuages.	Mths	1st.	11th	21st.			Against May	
O. S. G	Mar. 1. Shrove S.		h m	h m	h m			the Sun rises	
Golden Number 12	4. Ash. Wed.	Jan.	8 5	7 58	7 45			d	h m
Epact (or D's Age	8. 1 Sun. Lent	Feb.	7 22	7 6	6 36			I	4 35
at Year's Begin-	Apr. 19. East. Sund	Mar.	6 32	6 12	5 52			11	4 20
ning) — 1	May 24. Rog. Sund.	Apr.	5 31	5 11	4 53			21	4 4
Sun's Cycle 23	28. Ascension.	May	4 35	4 20	4 4			Diff. 15 Mi-	
Roman Indiction 11	June 7. Whit Sund	June	3 51	3 45	3 43			utes in 10	
Era Jul. Pe Jan. 6491	14. Trin Sund.	July	3 46	3 54	4 4			Days nearly;	
— Olymp. Jul. 2554	Nov. 29. Adv. Sund	Aug.	4 20	4 36	4 54			or 1½ Minute	
— Foun Ro. Ap. 2531	Ember Days.	Sept.	5 15	5 32	5 54			a Day.	
— Nabonaf Fe. 2525	We. Fr. Sa.	Oct.	6 13	6 33	6 33			N. B. Sun-rif-	
— Hegira, July 1157	March 11, 13, 14.	Nov.	7 12	7 30	7 45			ing sub. from	
Greg. Era, O. R. 196	June 10, 12, 13.	Dec.	7 58	8 6	8 8			12 H. gives	
Yrs completed at the	Sept. 16, 18, 19.							Sun-setting.	
Mths, O. S. Olymp.	Dec. 16, 18, 19.								
Yrs more than by de	* Therelt the same								
la Lande *. See	with his Corr. in								
Axioms and Rules,	Con. des Tems.								
p. 351.									

N. B. The complete Years of the several *Æras* end at the Month, when the current Year takes Place.

Astronomical MOONS for Greenwich Observatory. 1778.

First Quarter.			Full Moon.			Last Quarter.			New Moon.			
Mths.	d	h m	d	h m	d	h m	d	h m	d	h m	d	h m
Jan.	5	20 32 A	13	1 34 M	20	1 18 A	28	2 47 A				
Feb.	4	4 36 A	11	2 47 A	19	10 44 M	27	4 48 M				
Mar.	6	0 41 M	13	5 16 M	21	7 15 M	28	4 1 A				
Apr.	4	7 49 M	11	8 22 A	20	0 53 M	27	1 0 M				
May	3	4 27 A	11	0 8 A	19	2 36 A	26	8 35 M				
June	2	2 33 A	10	3 51 M	18	0 24 M	24	3 38 A				
July	1	2 47 A	9	6 47 A	17	7 42 M	23	11 6 A				
	31	5 41 M										
Aug.	29	11 15 A	8	8 24 M	15	1 31 A	22	8 5 M				
Sep.	28	6 33 A	6	8 42 A	13	7 10 A	20	7 19 A				
Oct.	28	2 0 A	6	8 2 M	13	1 48 M	20	9 31 M				
Nov.	27	7 51 M	4	6 47 A	11	10 27 M	19	2 45 M				
Dec.	26	11 10 A	4	5 30 M	10	9 49 A	18	10 4 A				

Add to the Month-Day for the Moon's Age.		Z	Sun's fame as Moon's Place, at New Moon.		Sun enters Signs.	Sub. and add from & to D's Southing for her Rising & Setting.		To find the Tides at London.	
No.	d		s	d.		s	d	h	m
Jan.	2	28	10	9	10 ^W 19	3	0	8	30
Feb.	3	27	11	9	11 ^X 18	4	2	8	15
March	1	28	0	8	0 ^V 20	5	1	7	15
April	2	27	1	7	1 ^X 20	6	0	6	15
May	3	26	2	5	2 ^{II} 21	7	11	5	15
June	5	24	3	3	3 ^{III} 21	8	10	4	15
July	6	23	4	0	4 ^{II} 22	9	0	4	0
Aug.	8	22	4	29	5 ^{III} 23	9	20	4	15
Sept.	9	20	5	28	6 ^{II} 23	10	29	5	15
Oct.	10	20	6	27	7 ^{III} 23	0	0	6	15
Nov.	11	19	7	27	8 ^I 22	0	29	7	15
Dec.	11	18	8	27	9 ^V 21	1	28	8	15

Here the Day of N. D. and No. added for the following Month make up the Days in the present Month.		Exam. II. May 29 Add No. 3		Reg. D Pl. Jan. 24. 1778.		20th L. W. 3 9 at London Bridge.	
Exam. June N. D. 24 & July No. 6 added = 30 Days in June.		Moon's Age 3		D's Age 26d.		N.B. Time of High and Low Water at Lond. serve for Boats bound down and up the River, or from Bridge to London respectively.	
To find Moon's Age.		When D's Age is above 29 or 30 ds. sub. 29 or 30, as 1 & 2 cols. (agt. Mth.) make 29 or 30.		Wants 4 Days of N. $4 \times 13^{\frac{1}{2}} = 1^s 23^d$		Gen. Rule. Add the Time of H. Water at New and Full D.	
Ex. I. Jan. 22 Add No. 2		To find Sun's Place. Sub. or add Degs. for Ds. bef. or aft. Center to Sn. for his Place		N D's Pl. Jan. 10 9 rem. D P. 24th 8 16 at Noon.		for any Place, according to a Tide Table for the Time of the Moon's Southing that Day, for High Water at that Place.	
Moon's Age 24		Required Sun's Place for Jan. 22d, 1778.		A near Computation.			
		23 Jan. @ Pl. 10 ^s 9 ^o		To find D's Rising and Setting. Jan. 24, 1778.			
		6 Ds. & Degs. — 6		D m. Pl. fr. ab. 8 ^s 16 ^o			
		22 Jan. @ Pl. 10 3 nearly, at Noon.		Arc * corref. $\mp 4^h 15^m$			
				D's So. Jan. 24, 8 ^m 32			
				D rises 24th 4 ^m 17 sets 24 0 ^a 47			
				N. B. Always take the * Arc \mp nearest, or proportional to D's Place above.			

* This Computation cannot be nearer, except D's Age was given to Hours.

N.B. The Festival marked * is preceded by a Vigil or Fast. If any of the Fast Days fall on a Monday, the Vigil or Fast Day must be kept on the Saturday before, and not on the Sunday, which is the greatest of Festivals.

The Days having this Mark † against them are Holidays observed at the Exchequer, Stamp-Office, Excise-Office, Custom-House, Bank, East-India, and South-Sea House.

☞ At the Custom-House there is no Holiday on Valentine, St. David, Shrove-Tuesday, Easter Wednesday, St. Swithin, Lammas-Day, Fire of London, or Holy-Rood.

†† The Offices are mentioned 'all but such and such,' after †, where no Holidays are kept, when they are kept in all other Offices.

MEMORANDUMS for the YEAR 1778.

JANUARY, XXXI DAYS.

- 1 Circumcision. †
- 4 2d Sunday after Christmas.
Sir Isaac Newton b. 1643, N.S.
- 6 Epiphany, or Twelfth Day. †
- 8 Lucian.
- 11 1 Sunday after Epiphany.
- 13 Hilary Camb. Term begins.
- 14 Oxford Term begins.
- 15 Exchequer opens.
- 17 Old Twelfth Day.
- 18 2 Sund. after Epiphany. Queen Charlotte's Birth-Day kept. †
Prisca.
- 20 Fabian. 1 Return.
- 21 Agnes.
- 22 Vincent.
- 23 Hilary Term begins.
- 25 3 Sund. after Epiphany. Conversion of St. Paul. †
- 27 Pr. Augustus Frederic b. 1773.
- 28 2 Return.
- 30 Ch. I. beheaded, 1648-9, O.S.
12m past One. †.

FEBRUARY, XXVIII DAYS.

- 1 4 Sunday after Epiphany.
- 2 Purification V. M. *
- 3 Bishop Blaize. 3 Return.
- 5 Agatha.
- 8 5 Sunday after Epiphany.
- 9 4 Return.
- 10 Dies Scholastica at Oxford.
- 12 Hilary Term ends.
- 13 Old Candlemas-day.
- 14 Valentine. † All but Stamp, Custom, and South-Sea House.
- 15 Septuagesima Sunday.
- 12 Sexagesima Sunday.
- 24 St. Matthias. *† Prin. Adolph. Frederick born.
- 25 Camb. Term divides M.
- 28 Hare Hunting goes out.

MARCH, XXXI DAYS.

- 1 Quinquagesima, or Shrove Sun.
St. David. Anniversary Meeting of the Welch Society, who wear a Leek on this Day, in Memory of a famous Victory over the Saxons. † All but the Stamp and Custom-House.
- 2 Chad B.
- 4 Ash Wednesday.
- 5 Princess of Hesse born.
- 7 Perpet. Mauric. Mart.
- 8 1 Sunday in Lent.
11, 13, 14, Ember Days.
- 12 Gregory Mart.
- 15 2 Sunday in Lent.
- 17 St. Patrick Bp. of Ireland.
- 18 Edward, K. of the W. Saxons.
- 19 Joseph. Prs. Louisa Ann born.
Camb. Term ends.
- 20 Equal Day & Night. Cuthbert.
- 21 St. Benedict.
- 22 3 Sunday in Lent.
- 25 Annunciation of V. M. *
LADY-DAY, 1st Quarter-d. †
- 29 4 Sund. in Lent, or Midlent-Su.
- 31 Sir Is. Newton died 1727, N.S.
a Miracle of the Age.

APRIL, XXX DAYS.

- 1 Fools Day.
- 3 Richard, Bishop of Chichester.
- 4 St. Ambrose.
- 5 5 Sunday in Lent. Old Lady-D.
- 9 Cambridge latter Aet, Thursday after 4th Sunday in Lent.
- 10 Camb. Term ends.
- 11 Oxford Term ends Saturday before Palm Sunday.
- 12 6 Sunday in Lent. Palm Sunday.
- 16 Maundy Thursday.
- 17 Good Friday.

EASTER

19 EASTER SUNDAY. * Alphege.

20 Easter Monday. †

21 Easter Tuesday. †

22 Easter Wednesday. †

23 St. George. †

25 St. Mark. †

26 1 Sunday aft. Easter. Low Sund.

27 Victory of Culloden.

29 Oxford and Camb. Term begin
Wednesday after Low Sunday
Term begins.

MAY, XXXI DAYS.

1 St. Philip and St. James. *†

3 2 Sunday after Easter. Inv. of
the Cross.

4 1 Return.

6 St. John ante Port Lat.
Easter Term begins.

10 3 Sunday after Easter.

11 2 Return.

12 Old May-day.

17 4 Sunday after Easter.

18 3 Return.

19 Q. Charlotte born, 1744. †
St. Dunstan.

22 Princess Elizabeth born 1770.

24 5 Sunday aft. Easter. Rogation
25, 26, 27 Rogation Days.

25 4 Return.

26 Augustine 1st Abp. of Canter-
bury. No Night.

27 Venerable Bede.

28 Ascension Day. * Holy Thurf.

29 K. Charles II. Nat. and Resto-
ration after 12 Years Exile.

30 5 Return.

31 Sunday after Ascension Day.

JUNE, XXX DAYS.

1 Nicomedes.

4 King George III. born 1738. *

5 Boniface, Pr. Ernest Augustus
born 1771.

7 Whit Sunday. *

8 Whit Monday. †

9 Whit Tuesday. †

10 Princess Amelia born 1717. †
All but the Exch. & Custom-h
10, 12, 13, Ember Days.

11 St. Barnabas. †*

14 Trinity Sunday.

15 1 Return.

17 St. Alban. Oxford Term begins

19 Trinity Term begins.

20 Transl. Edw. K. W. Saxons.

21 1 Sunday after Trinity.

22 2 Return. Longest Day.

24 ST. JOHN BAPTIST. † 2d Quar-
ter Day.

28 2 Sunday after Trinity.

29 St. Peter and Paul. *†

30 Buck-hunting comes in, and
continues till Holy-rood. Ex-
eter and Wadham Col. Elect.
at Oxford. 3 Return.

JULY, XXXI DAYS.

2 Visitation of B. V. Mary.

4 Translation of St. Martin, Bp.

5 3 Sunday after Trinity. Old
Midsummer Day.

Dies Comitiorum.

7 Cambridge Commencement for
B. A. 1st Tuesday in July,
Tho. à Becket, Church Tyrant.

10 Camb. Term ends.

11 No Night.

12 4 Sunday after Trinity.

15 St. Swithin. † All but Stamp,
Custom and S. Sea House.

16 Oxford Act, Thursday after 4
Sunday past Trinity.

18 Oxford Term ends.

19 5 Sunday after Trinity.

20 Margaret, Virgin, and Martyr.

22 Queen of Denmark b. 1751.
Mary Magdalen.

24 Magdalen College Election.

25 St. James. *†

26 6 Sunday after Trinity. St. Ann,
Mother of B. V. Mary.

27 Portfm. Dock fired at 4 o'clock
in the Morning, 1770.

30 Dog Days begin.
Cinacula rises with the Sun.

AUGUST, XXXI DAYS.

1 Lammas Day.

2 7 Sunday after Trinity.

4 Crown Point in America taken
by General Amherst, 1759.

6 Transfiguration.

7 Name of Jesus.

9 8 Sunday after Trinity.

10 St. Laurence.

11 Prs. of Brunf. b. 1737. † All
but Cust. and S. Sea House.

12 Pr. of Wales b. 1762. †

15 Assumption.

9 Sunday

9 *Sunday after Trinity.* Prince
Fred. Bish. of Osnab. b. 1763.

21 Athanasius. P.W.Hen.b. 1765.

10 *Sunday after Trinity.*

14 St. Bartholomew. *†

28 St. Augustine.

29 Beheading St. John Baptist.*

11 *Sunday after Trinity.* Sun
and Clocks together.

SEPTEMBER, XXX DAYS.

1 St. Giles.

2 London burnt, 1666. O. S.

12 *Sunday after Trinity.*

7 Eunuchus.

8 Nativity of B. V. Mary.

9 Dog Days end. Canis Major rises
with the Sun at 3 in the Morn.

13 *Sunday after Trinity.*

14 Holy Cross Day. † All but
Stamp, Cust. and S. S. House

16, 18, 19 Ember Days.

17 Lambert, Bp.

18 City of Quebec surrendered to
Gen. Townshend 1759. King
G. I. & II. landed. † All but
Custom House.

14 *Sunday after Trinity.*

21 St. Matthew. *†

22 K. Geo. III. and Q. Charlotte
crowned 1761. † All but the
Cust. H. Equal D. and Night
in all the World.

26 St. Cyprian.

15 *Sunday after Trinity.*

28 Sheriffs of London sworn.

29 St. MICHAEL, Third Quarter
Day. † Hare-hunting comes in,
and lasts till the End of Feb.
Prs. Charl. Augusta b. 1766.

30 St. Jerome.

OCTOBER, XXXI DAYS.

1 Remigius, Bp. of Rhemes.

4 16 *Sunday after Trinity.*

6 St. Faith.

9 St. Denis.

10 Old Michaelmas Day.

11 17 *Sunday after Trinity.*

12 Oxford and Camb. Term beg.

13 Transl. of Edw. Conf.

17 Ethelred.

18 *Sund. aft. Trinity.* St. Luke.

19 St. Frideswide, a Fest. at Court.

25 9 *Sunday after Trinity.* King

Geo. III. Accession. Crispin.

26 K. Ge. III. proclaimed, 1760.

28 St. Simon and Jude. *

NOVEMBER, XXX DAYS.

1 20 *Sund. aft. Trinity.* All Saints. †*

2 All Souls. Pr. Edw. b. 1768. All
but Stamp, Cust. & S. S. House.

3 1 Return.

4 King William born.

5 Gunpowder Treason, 1605. †

6 Leonard. Mich. Term begins.

7 Duke of Cumberland b. 1745.

8 21 *Sunday after Trinity.*

Prs. Aug. Sophia born 1768.

9 Lord Mayor's D. at London. †
All but Exchequer.

11 St. Martin.

12 2 Return.

13 Britius, Bishop.

15 22 *Sund. aft. Trinity.* Machutus.

17 Hugh, Bp. Lincoln. Anniver-
sary Q. Elizab. Procl. † All but
Custom & S. S. House.

18 3 Return.

20 Edmund, King and Mart.

22 23 *Sunday after Trinity.*

Cecilia. Old Martinmas Day.

23 St. Clement.

25 St. Catharine. D. Glof. b. 1743.

26 Baliol Col. Election, Thursday
before St. Andrew.

29 *Advent Sund.* Mich. Term ends.

30 St. Andrew. *

DECEMBER, XXXI DAYS.

4 Barbary.

6 2 *Sunday in Advent.* Nicholas.

7 Portsmouth Dock-yard fired by
John the Painter, 1776.

8 Conception of B. V. Mary.

13 3 *Sunday in Advent.* Lucy.

16, 18, 19 Ember Days.

O Sapient. Ox. & Cam. T. ends.

20 4 *Sunday in Advent.*

21 St. Thomas.

25 CHRISTMAS DAY.* Fourth
Quarter Day. Fox-hunting
comes in, and lasts till Lady-d.
Sun and Clocks together.

26 St. Stephen.

27 *Sunday after Christmas.*

St. John the Evangelist. †

28 Holy Innocents.

31 Sylvester, Bp. of Rome.

A TABLE

A TABLE of the Moon's Southing, or Times when She passes the Meridian of Greenwich Observatory, for the Year 1778. For the Use of Seamen to find the Time of Tides, &c.

	Jan.	Feb.	Marc.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
D	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m
1	2a 13	3a 18	2a 3	3a 37	4a 32	6a 3	6a 7	6a 51	8a 3	8a 35	9a 43	9a 53
2	3 3	4 7	2 54	4 36	5 32	6 49	6 49	7 37	8 54	9 24	10 32	10 48
3	3 52	4 56	3 46	5 36	6 28	7 23	7 31	8 25	9 45	10 14	11 22	11 46
4	4 40	5 47	4 40	6 35	7 19	8 15	8 14	9 14	10 36	11 3	Morn	Morn
5	5 28	6 41	5 36	7 32	8 7	8 57	8 58	10 5	11 26	11 51	0 16	0 50
6	6 17	7 38	6 34	8 26	8 52	9 38	9 44	10 56	Morn	Morn	1 13	1 54
7	7 7	8 37	7 33	9 16	9 35	10 22	10 32	11 47	0 15	0 41	2 14	2 58
8	8 0	9 37	8 32	10 3	10 17	11 6	11 21	Morn	1 3	1 32	3 17	3 59
9	8 56	10 36	9 28	10 48	10 59	11 53	Morn	0 37	1 51	2 27	4 19	4 54
10	9 55	11 32	10 21	11 31	11 42	Morn	0 12	1 26	2 46	3 24	5 20	5 45
11	10 56	Morn	11 11	Morn	Morn	0 41	1 2	2 13	3 32	4 24	6 16	6 32
12	11 57	0 25	11 58	0 14	0 26	1 31	1 52	3 0	4 25	5 25	7 8	7 16
13	Morn	1 14	Morn	0 56	1 11	2 21	2 41	3 47	5 22	6 25	7 57	7 58
14	0m 55	2 0	0 43	1 40	1 56	3 11	3 28	4 36	6 21	7 23	8 42	8 40
15	1 51	2 45	1 27	2 25	2 47	4 0	4 14	5 27	7 22	8 18	9 26	9 23
16	2 42	4 27	2 9	3 11	3 38	4 48	5 1	6 21	8 22	8 9	10 9	10 7
17	3 29	4 10	2 52	3 59	4 28	5 35	5 48	7 19	9 20	9 57	10 51	11 52
18	4 13	4 53	3 36	4 49	5 18	6 22	6 38	8 19	10 15	10 43	11 35	11 40
19	4 55	5 38	4 22	5 40	6 7	7 9	7 31	9 21	11 6	11 27	0a 19	0a 28
20	5 37	6 24	5 9	6 51	6 56	7 58	8 27	10 22	11 54	0a 11	1 6	1 18
21	6 18	7 11	5 58	7 22	7 44	8 51	9 27	11 20	0a 40	0 55	1 54	2 7
22	7 1	8 0	6 49	8 12	8 33	9 47	10 31	0a 16	1 25	1 40	2 44	2 55
23	7 45	8 53	7 41	9 3	9 23	10 47	11 34	1 7	2 9	2 26	3 33	3 43
24	8 32	9 46	8 33	9 53	10 15	11 50	0a 35	1 54	2 53	2 13	4 22	4 27
25	9 21	10 39	9 25	10 44	11 12	0a 55	1 32	2 39	3 39	4 2	5 9	5 11
26	10 12	11 31	10 17	11a 37	0a 11	1 58	2 24	3 23	4 25	4 52	5 57	5 55
27	11 4	0a 22	11 8	0 32	1 13	2 55	3 14	4 6	5 13	5 42	6 43	6 40
28	11 57	1 13	11 59	1 29	2 17	3 49	3 59	4 50	6 3	6 32	7 28	7 27
29	0a 49		0a 51	2 36	3 19	4 38	4 42	5 36	6 54	7 20	8 14	8 18
30	1 40		1 45	3 32	4 18	5 24	5 25	6 23	7 44	8 8	9 2	9 13
31	2 29		2 40		5 13		6 8	7 12		8 56		10 12

To find the Time of H. Water on any Day of the Month at any given Place, for 1778.

Gen. Rule. To the Time of the Moon's Southing (from the above Table) for that Day, add the time of H. W. at N. or F. Moon on the given Place, (from Tide Table, p. 105, 106, Pal. 1765, or any other Tide Table) and the Sum abating 12, when above 12 Hours, will be Time of High Water.

Example. To find the Time of High Water at London, on May 2, 1778. h m
From the above Table the Moon souths at London, on that Day, May 2, 5a 32
To which add the constant Time of High Water at New and Full, at London. 2 30

Time of High Water, May 2, at London, 8a 2
Add for next Low Water 5 48

Low Water at London, May 3 in the Morning, 1m 50

* * * Seamen may determine the Time of H. W. at N. and F. Moon, at any Place from a Tide Table. The above Table is also of Use for finding the Moon's near Time of Rising and Setting at any Place or Part, from her mean Place, and semi-diurnal Arc corresponding.

PALLADIUM AUTHOR.

**A TABLE of the ECLIPSES of the First SATELLITE of JUPITER, for
Greenwich Observatory, 1778.**

For finding the Difference of Longitude of Places by Sea and Land.

January.			February			March.			April.			May.			June.		
Immerfi.			Immerfi.			Emerfi.			Emerfi.			Emerfi.			Emerfi.		
D	h	m s	D	h	m s	D	h	m s	D	h	m s	D	h	m s	D	h	m s
1	11*	7 36	2	7*	29 49	2	17	24 17	1	19	39 25	1	21	53 32	1	0	0 4
3	5	35 15	4	1	58 7	4	11*	53 16	3	14*	8 38	3	16	22 20	2	18	28 22
5	0	2 50	5	20	26 33	6	6	22 16	5	8*	37 48	5	10*	51 13	4	12	56 45
6	18*	30 27	7	14*	54 58	8	0	51 19	7	3	7 1	7	5	19 58	6	7	25 7
8	12*	58 4	9	9*	23 26	9	19	20 22	8	21	36 9	8	23	48 45	8	1	53 22
10	7	28 50		Emerfi.		11	13*	49 25	10	16	5 16	10	18	17 30	9	20	21 42
12	1	53 49	11	6*	7 47	13	8	18 31	12	10*	34 23	12	12	46 10	11	14	49 56
13	20	21 22	13	0	36 24	15	2	47 40	14	5	3 31	14	7	14 54	13	9	28 16
15	14*	49 10	14	19	4 57	16	21	16 46	15	23	32 36	16	1	43 32	15	3	46 31
17	9*	17 2	16	13*	33 39	18	15	45 56	17	18	1 42	17	20	12 8	16	22	14 47
19	3	44 58	18	8*	2 21	20	10*	15 5	19	12*	30 46	19	14	40 42	18	16	43 1
20	23	12 54	20	2	31 7	22	4	44 16	21	6	59 50	21	9*	9 21	20	11	11 19
22	16*	40 53	21	20	59 54	23	23	13 27	23	1	28 51	23	3	37 50	22	5	39 29
24	11*	8 52	23	15*	28 41	25	17	42 39	24	19	57 50	24	22	6 23	24	0	7 47
26	5	36 57	25	9*	57 32	27	12	11 51	26	14	26 49	26	16	34 48	25	18	36 9
28	0	5 7	27	4	26 25	29	6	41 4	28	8*	55 43	28	11*	3 14	27	13	4 15
29	18*	33 20	28	22	55 20	31	1	10 13	30	3	24 35	30	5	31 36	29	7	32 29
31	13*	1 31															
July.			August.			September			October.			November			December		
Emerfion.									Immerfi.			Immerfi.			Immerfi.		
D	h	m s							D	h	m s	D	h	m s	D	h	m s
1	2	0 50	The Eclipses of all the four Satellites will be invisible this Month on the Account of Jupiter's Vicinity to the Sun. N.B. The Asterism over the *, denote that Eclip. visible at Greenwich			The Eclipses of all the Four Satellites will be invisible this Month on the Account of Jupiter's Vicinity to the Sun.			1	0	44 12	1	21	21 58	1	23	18 42
2	20	29 2							2	19	13 12	3	15*	50 27	3	17*	46 21
4	14	57 21							4	13	42 16	5	10	18 47	5	12	14 1
6	9*	25 38							6	8	11 14	7	4	47 4	7	6	41 39
8	3	54 1							8	2	40 11	8	23	15 20	9	1	9 11
9	22	22 19							9	21	9 5	10	17*	43 34	10	19	36 49
11	16	50 40							11	15	38 1	12	12	11 42	12	14*	4 16
13	11	19 6							13	10	6 50	14	6	39 52	14	8	31 51
15	5	47 28							15	4	35 41	16	1	7 57	16	2	59 16
17	0	15 56							16	23	4 29	17	19	35 59	17	21	26 52
18	18	44 21							18	17*	33 15	19	14*	3 55	19	15*	54 17
20	13	12 50							20	12	1 59	21	8	31 54	21	10	21 47
22	7	41 16							22	6	30 41	23	2	59 48	23	4	49 19
24	2	9 51							24	0	59 18	24	21	27 37	24	23	16 51
25	20	38 26							25	19	27 58	26	15*	55 28	26	17*	44 21
									27	13	56 29	28	10	23 14	28	12*	11 50
									29	8	25 5	30	4	51 1	30	6	39 21
									31	2	53 30						

To find the Difference of Longitude from Greenwich Observatory.

Rule. The Difference of Time between any Eclipse of Jupiter's First Satellite, at Greenwich, happening as above, and the Time the same Eclipse is observed to happen, under a distant Meridian, being turned into Degrees, at Sea or Land, will be the Difference of Longitude between Greenwich and the Place of Observation.

Example. Eclipse of the First Satellite of Jupiter at Greenwich Jan. 3, 5 35 15
The same Eclipse being observed at Sea, or a distant Port, later Jan. 3, 11 20 19
Multiply h. m. s. in Time by 15 for D. M. S. Diff. Long. Hence the }
Diff. of Long. to the East of Greenwich is 86° 16^m req. Diff. later } 5 45 4

N. B. The later Time, in respect of the Time at Greenwich, or First Place, is East, the sooner Time West Longitude from Greenwich.

THREE ECLIPSES in the YEAR 1778.

Two of the SUN, and One of the MOON.

I. Of the Sun, on Wednesday, June 24, in the Afternoon, Visible.

According to Nevil Maskelyne of Greenwich, for that Place.

	h	m	
Beginning	3	41	Afternoon
Greatest Obscurat.	4	35	
Visible Conjunct.	4	36	
End	5	27	
Digits Eclipsed	6° 10'		Apparent Time at Greenwich
on the Sun's Southern or Lower Limb.			
The First Impression of the ☽ on the ☉'s Border, will be at 19 ⁰ $\frac{1}{2}$ from ☽'s Bottom, on the Right Hand.			Nautical Ephemeris

According to Thomas Cowper of Wellingborough, for that Place, in the Middle of England.

	h	m	s	
Beginning	3	38	20	} Afternoon Apparent Time. Wellington. rough.
Middle and visible	4	32	0	
Conjunct.				
End —	5	22	3	
Digits Eclipsed	5°	49	$\frac{1}{2}$	

N. B. In this Eclipse, the Visible Way of the ☽ from the ☉, is almost parallel to the Ecliptic. Wherefore the Times of the visible Conjunction and greatest Obscuration coincide; and the Line of the ☽'s apparent Path, is nearly a straight Line; but a little concave towards the Axis, at Wellingborough.

II. Of the Moon, on Friday, December 4, at 4 in the Morning, Visible.

	h	m	
Beginning	4	24	Morning.
Middle	5	37	
End	6	49	
Digits Eclipsed	6° 14'		Apparent Time.
on the ☽'s Northern or upper Limb.			

N. B. We are sorry to find it so difficult to prevail with our Correspondents, after so many Sollicitations and Admonitions, to give the Times and Appearances of all Eclipses, for Greenwich; as they thereby might be compared with the Times calculated from the Tables adapted to that Situation; whereby the Astronomical Tables might be judged of and corrected. Whereas the Times and Appearances for other Places chiefly serve the Purpose of the Ignorant and Vulgar to gaze at, unprepared with Instruments and Means for Observing the real Times and Appearances as they happen.

III. Of the Sun, on Friday, December 18, Invisible.

Conjunction - 10^h 4^m
 ☉ & ☽ in 8^s 27⁰ 12'; ☽'s Latitude 36' 51" South.
 ☉ centrally eclipsed on Meridian 10^h 5^m $\frac{1}{2}$.
 In Longitude 151° 23' West, and Latitude 66° 31' South.

Thomas Cowper of Wellingborough gives the Times and Quantities of the First Solar Eclipse, 24th June, 1778, for different Places, as follows:

For the great Fishing Bank of Newfoundland, where it will be seen total above Six Minutes, on the Southern Part of that Bank.

Latitude 41° 30' N. Long. 54° W. from London.

Beginning, or First Contact	10	40	50	Apparent Time.
Immersion, or Beginning of Total Darkness	11	59	5	
Visible Conjunction, Middle Central Appearance, and greatest Obscuration in the Nonagesimal	0	2	16	
Degree of Ecliptic				
Emergence, or End of Total Darkness	0	5	2	Apparent Time.
End, or last Contact	1	24	6	
Continuance of Total Darkness	0	6	24	
Whole Duration	2	43	16	

Digits 12° 29' $\frac{1}{2}$.

For

For *Annapolis Royal* in *Nova Scotia*,Lat. 45° N. Long. 64° W.

	h	m	s	
Beginning	9	48	26	} <i>Apparent Time Forenoon.</i>
Vis. Conjunction	11	1	54	
Middle	—	11	3 46	
End	—	12	22 33	
Duration	2	34	7	
Digits Eclipsed	10°	38'	$\frac{1}{2}$	

For *Philadelphia*, Lat. $46^{\circ} 50'$ N.Long. 74° W. from *London*.

	h	m	s	
Beginning	8	51	29	} <i>Apparent Time Morning.</i>
Vis. Conjunction	10	1	34	
Mid. or gen. Obsc.	10	3	7	
End	—	11	21 50	
Duration	2	30	21	
Dig. of Darkness	11°	13'	30"	

For *Gibraltar*, Latitude 36° North, Longitude 32° West from *London*.

	h	m	s	
Beginning	—	—	—	} <i>Apparent Time Afternoon.</i>
Middle	—	—	—	
Visible Conjunction	—	—	—	
End	—	—	—	
Duration	—	—	—	

Digits obscured $11^{\circ} 8'$.

For the *Azores*, or *Western Isles*. This Eclipse will be total and nearly central at *Corvo*, the most northern of these Isles; at *Carvo* Latitude 48° North, Longitude 32° West from *London*.

	h	m	s	
Beginning, or First Contact	—	—	—	} <i>Apparent Time Afternoon.</i>
Beginning of Total Darkness	—	—	—	
Middle of Total Darkness	—	—	—	
End of Total Darkness	—	—	—	
End, or last Contact	—	—	—	
Continuance of Total Obscurity	—	—	—	
Whole Duration	—	—	—	

Digits Eclipsed $2^{\circ} 24' 5''$.

N. B. The *Types* representing the true Appearance of all the Eclipses, which are accurately and curiously delineated, are Six in Number, and would not have cost less than a Guinea to have been cut, besides taking up too much Room. We therefore were obliged to omit so desirable a Curiosity, on account of the unanswerable Expence.

The industrious Author's Account of the *general Phenomena*, or *Principal Appearances* of this *Solar Eclipse*, with respect to the Meridian of *London*, is very curious, but we have not Room for it; requiring no less Room than the full Space of a *Palladium Page* to print it; by doing which we should contract our *General Plan* too much.

Continued OBSERVATIONS on the WISDOM of CREATION, (See p. 2.)

15. An Egg is a wonderful Material and inanimate Substance and Form, prepar'd for Animation, from Heat only, by the Divine Creator of all Things.—All Vegetable Forms and Substances are wonderful!—Subterraneous Productions, and Productions of the Deep, are the same.—Can any Man behold these Wonders and be an Atheist?

16. If *Prometheus* vainly attempted to make a Man, the highest Rank of known animal Beings, his Vanity and Folly had been discovered as much in attempting to make a Fly, or one of the lowest Reptiles.—Had he attempted to revive or restore a dead Man, or other Animal (ready made to his Hands) to Life, his Folly and Presumption had been equally apparent.

17. All the different Orders and Species of created Animals, are, by Inferiority of Sense, made subordinate to the Dominion of Man's highest Rank of Perception and Understanding. The inferior Animals are therefore all under Man's Power and Subjection.

All are but Parts of one stupendous Whole,

Whose Body Nature is, and GOD the Soul. POPE'S ESSAY.

The WISDOM and WONDERS of CREATION, further illustrated in the SINGING of BIRDS. By the HON. DAINES BARRINGTON. (See Philosophical Transactions, Vol. LXIII. p. 249, 1773.)

ANIMADVERSIONS.

Non solum mirificè, sed certè et verè.

THIS curious Philosophical Account of the different Notes acquired by the different Species of Singing Birds*, explains how the same and different Songs among the whole feathered Race of Choristers originate, and are continually acquired. And the Pairs of both Sexes of each Species descended by generation, *ab Origine*, may be traced down to Creation of the First Pair (*Male and Female*) of each separate Species of Birds or other Animals: as without original Creation by Pairs, there could be no Multiplication or Increase by successive Generation, of any animal Beings whatsoever.

The original Mode of Creation is wonderful, and incomprehensible to a created finite Mind! as are likewise the Powers and Principles of successive Generation, no less wonderful and incomprehensible to the most acute and penetrating Philosopher! yet the Certainty of our conscious Sensibility of every Mode of living Existence is not diminished by the *Incomprehensibility* of those Modes. The Fact and Act of original Creation, and of the successive Generation of all living Beings, are evident to Sense; though not understood by the human Conception.

How the several Species of Birds were originally produced is incomprehensible! How they are produced from the generated and inanimate Eggs, by the simple Power of Heat, acting upon the *living Principles* contained in the lifeless material Substance of Eggs so curiously constructed, and accommodated to receive the genial and vivifying Heat, is also incomprehensible! But the Certainty of the original Creation and Formation, as well as the successive Generation of Birds, and of all other Kinds of animal Beings, are evident to Sense and our conscious Perception.

The Limits of Creation and Generation are Depths beyond our Reach to fathom, and lie beyond our Ideas, and through which infinite Abyss we cannot pass, and are lost in Astonishment at the unsearchable Power and Wisdom of the Creator perceived in all his wonderful Works!

With respect to the Properties of *Singing Birds*, the HON. DAINES BARRINGTON, above mentioned, has observed, that the Loss of the Parent Cock-Bird, by Accident, at the Time of the Nestlings being under his Instruction, for the Regulation of their future Notes and Song, will produce a Variation therein from the Originals of the same Species; because the Nestlings learn the Notes and Song of the Singing Birds they hear or happen to be near, when the Parent Cock-Bird is lost: the Mother, or Female Bird, never sings but imperfectly, as an Hen only attempts to crow. So that all the Variety of Notes that happen among every Species of the feathered Choir are accounted for, from the Mixture of Notes learned from the different Tutor-Birds near the Nestling Scholars, and their descendent Pupils.

Hence we are instructed by the said Philosophical Author, that from the said Mixture of Notes all the Variety of Notes happen that can be heard or imagined among the Warblers that now fill the Woods and Groves, or that shall hereafter fill them, in our own or any other Nation, with all their delightful Harmony! That by the Chance of Instructors to Nestling-Birds, and their descendent Pupils, all the possible Variety of Notes and Song happen among these sylvan Choristers. It is discovered by this Author, that

some

* See the said Transaction.

some Birds are not fitted with Organs, or *Larynxes*, for musical Notes, or Song. For a Cow can low, but she is not fitted with Organs, or a *Larynx* for singing.

The various Languages or Speech used by Men, for conveying their Sentiments to each other, are instructively compared by the said Author to the different Notes acquired by Singing Birds, through Accident of Instruction. And similar Causes and Accidents are assigned for the Production of all the Varieties of Speech among Men, and Notes of Birds that have happened, requiring equal Difficulties to trace the Original of both; derived from Causes and Accidents running in a Parallel. That as some Birds are found to be incomplete and defective in their Singing Organs, so some Men are found to be defective and inarticulate in their Speech or vocal Sounds.

It is also remarked by the same Author, that a vast Number of Men assembled, as at the Roll-Call of a Regiment, each Man may as certainly be known and distinguished from all others by hearing his Voice, as by seeing him. As a Call-Clerk, or Clerk of the Cheque, in a Dock-Yard, can distinguish any Man from all others, by his Voice frequently heard, as well as by seeing his Face. And how wisely it is ordered by the all-wise Creator, that no two Men shall wear Visages alike, in order to prevent the One being answerable for another's Crimes laid to his Charge. It is to be remarked, that each Sheep of a numerous Flock is well known also, and can be sworn to, if lost, by the Shepherd of the Flock, whose distinguishing Eye can ascertain the identical Object, from frequent Observation. In like manner each Goose of a large Flock is known and distinguished by the Eye of the Gosherd.

The Utility of this curious ESSAY on the Notes and Song of Birds is without Doubt of this Importance: it immediately refers to the Investigation of Truth, in an Application and Exertion of the Human Faculties, by a Connection and Comparison with those of Birds, and of other Creatures; whereby the Mind is enlarged and improved in its ideal and philosophical Acquirements.

We may observe, that the Examples of Birds, and of other Animals, are so many Monitions to Men. In the provident Ant, industrious Bee, mathematical Spider, laborious Horse, faithful Dog, &c. and their different Instincts, impressed on their Natures by the divine Energy, are so many solid Lessons of Instruction to Mankind. That, though the building of Birds Nests are performed by the peculiar Instinct of each Species of Birds, (without any other First Teacher) as well as of the Bees making Honey and Waxen Cells, exceed all human Comprehension and Reason of Men to perform the like; yet they are Lessons of Wisdom and Instruction to Men, given by the Great Creator, who has endowed every Animal Species, and especially of the feathered Kind, with wonderful and instructive Properties.

We may also observe the acute and distinguishing Scent (or quick Smell) of the sagacious Hound, the Memory and Docility of the Horse and Dog; the Instructiveness of the Parrot and other Animals; the Strength and Capacity of the Elephant; the Contrivance of the Beaver; the piercing Sight of the Lynx; the dim and diminished Sight of the Mole; and other extraordinary Qualities of created Animals, no less wonderful than instructive to Mankind.

Remarks are made by the said philosophical Author, on the musical Notes of Birds, that they are only superceded and excelled by the articulate Words, joined with the musical Sounds of Men, from their striking Effects on the Senses, with which their superior Natures are endowed. That though these

these Musical Notes and Sounds, and their Divisions on a musical Instrument, rival the Harmony of Birds, yet the Harmony of the feathered Chords is a *Melody* formed by the great Creator, for the Pleasure and Admiration of Mankind, to whom all other created Beings are made subordinate; but by their harmonious Emulation, and their gaudy Plumage, they vie in Harmony and Beauty with each other, and dignify Creation! That Nature in her richest Attire would appear dull and languid without the Presence of these enlivening Songsters; and would fall greatly short of that Perfection with which the whole *terrestrial* Globe is now crowned and adorned; to which Whole every Part is admirably subservient, and to each other.

Whether the cheerful *Swallows* have the same Notes at *Senegal* in *Africa*, with those Birds seen in *England*, is an Enquiry made by the said Author, not yet determined; which being decided, the Retreat of that Species of Birds, in the Winter Season, will be more satisfactorily ascertained than at present.

By the *African* Bird, called the *Vengolina*, educated under the *British* Linnet, (an instructive Bird beyond others) we are instructed by the said Philosophical Author, that the *British* Woods may come to be filled with the Harmony of the *African* Groves; and may also come to be filled with the Harmony of the *American* Woods, by the Importation of choice Birds from those Quarters of the Globe. That the *Mocker American* Bird, will be a good Instructor to *English* Birds; as well as *English* Birds, educated under Foreign Instructors, will be good Scholars. It is likewise observed by the same Author, that by the Means of Importation, the *English* Woods and Groves may come to be harmonized with an endless Variety of Song.

Analogous to which Importation of Birds we may here observe, that from the Importation of curious Flowers, the Variegations of Flowers may be vastly diversified, and beautifully extended, by Inoculation of the different Species of Flowers, of different Sexes, with each other. The human Race, in like Manner, may be farther observed, by a Mixture of different Males and Females, in different Nations casually united, have been diversified and multiplied from the Beginning.

It has been curiously remarked by the said Author, that the different Descendants from tutored Birds would form an Aviary (or Paradise of Birds) of infinitely diversified Harmony.

That a *Nestling Woodlark* being educated under a *Nightingale*, will prove a good Scholar, and give Credit to it's Tutor and Entertainer.

That a *Nightingale* reared in a Cage, is observed seldom to live above a Year or Two, and not to sing above Three or Four Months. That a *Woodlark*, or a *Skylark*, instructed by a *Nightingale* (hung in a Cage near it) is found, not only to be more wavering than his Tutor, but will continue to sing Nine Months in the Year; besides out-living his Tutor. With many other curious Remarks and Observations by the same philosophical Author, on the Properties of Singing Birds; affording Pleasure and Improvement to every Mind enquiring after curious and useful Science, that can delight and instruct Mankind. A short Extract and Animadversion on which is therefore here offered to the Curious and judicious Reader; who is referred to the satisfying Original for the Rest, by

THE PALLADIUM AUTHOR.

INSTINCT

INSTINCT in BIRDS and other ANIMALS *similar to GENIUS in MEN of the First Rate INTELLIGENTS, impressed by the DIVINE CREATOR, for Purposes of his own WISDOM and GLORY.*

AS INSTINCT among the *Creatures* has always appeared to be the unerring *Mark* of the CREATOR'S Wisdom, with which he has endowed them, in different Degrees of subordinate Capacity and Sagacity, and directed them to be respectively governed by, to answer his grand Purposes of Creation; so likewise he has endowed Mankind with visible and different Degrees of Capacity and Genius, to dignify and distinguish them from each other, in this his highest Rank of created terrestrial Beings. These different Powers of Instinct and Genius among the *Creatures*, answer the different and respective Ends for which they were designedly created. Which infinite Combinations and Diversifications of Sense in the observed Subordinate Capacities and Sagacities among the different Orders of Animals and animal Species, all subordinate to the highest Rank of *Mankind*, and to one another, constitute the mutual Dependency of the whole animal Creation. And by Analogy of Reasoning, the whole Order of *Universal Nature*, both as to animate and inanimate Creation, contained in the unlimited Heavens, from the remotest and unknown Orbs, to whatever is contained in our limited and known terrestrial Habitation, from the Wisdom of the highest *Archangel*, next the Throne of GOD, to the Instinct of the lowest *Reptile* upon Earth, mutually subsist by the Harmony of an infinite Connection and Dependence of each Part of the Whole, as directed by the ALMIGHTY CREATOR.

To rise from the astonishing Properties of *Instinct* observed among different Animals, to the more astonishing Powers of Wisdom and Genius, discovered to our Observation among different Ranks of Learned and Wise Men, dawning with Wisdom from their *Childhood*, and rapidly increasing with their Years to early Abilities of Manhood, we are taught a further Lesson of GOD'S Wisdom in all his Works! We have set before us the Reverence due to our Superiors in high Stations, dignified with God's Honors, and adorned with extensive Minds and Capacities, fitted for the highest Stations and important Trusts in Government. As Men of inferior Talents and Capacities are fitted to act in a subordinate Concert, of one under another, from the wisest governing King (according to original Institution) or First Minister, to the lowest Labourer.

However the Propriety of Station among Men, by Chance or Accident, may happen sometimes to be perverted, God's Wisdom is not the less conspicuous in his universal Plan, in suiting different Capacities to different Stations of Life.

Hence it may be observed, that Men of low Stations have sometimes been patronized and promoted to the more elevated Stations, for which they were observed to be better adapted, by the discerning Wisdom of Persons of high Rank, living in the same Age, according as they were judged more or less capable of serving in the public Stations of a Community and Government. It would be endless to recite the *Instances* of Men of Genius being raised, by their Merits, from the low to high Stations in Life, for noble and useful Purposes! apparently directed by God's Providence, that shines through, dignifies, and adorns the whole Compass of Creation!

For the Great Creator may be observed frequently attending to the Order of his Works; and, in superintending, he revises and improves them to a still greater Degree of Perfection, according to the variable Mode of Creation! The great Men of *Antiquity*, as well as Numbers of the modern
Learned

Learned Men, of elevated *Genius* and *Capacity*, raised by their *Ability* and *Merit*, are remarkable *Instances* of GOD's Favour and Providence, in endowing them with such exalted Talents and Understandings. And, as we have at this Time of Day, numerous young Men of *Genius* and *Capacity*, whose Talents break forth, like the *Sunshine* from behind a Cloud, their Birth being obscured, they in Time may come under the Notice of the *patronizing* Wife and great Men of the Age, wherein they now live, so as to fill the Stations of Life for which they are best qualified by their *Genius* and *Education*, to do Honour to their Patrons, Service to their Country, and fulfill the Ways of God's Providence.

We shall here lay an uncommon *Instance* of a young and fruitful *Genius* of Learning and Capacity before the Public, worthy, as we conceive, of being advanced from his youthful Obscurity; of whose excellent Talents the following *Account* is a substantial Evidence.

We have lately discovered a *curious Work*, of Learning and *Genius*, intitled *SYLVÆ*: being a *Collection of Poems* on several choice and important Subjects, not inferior, as we conceive, to the Productions of a *Pope* or a *Smart*, for Utility and Elegance. By a young Gentleman late of *Chichester*, but now of *Guildford*, in *Surry*. Price 2s. 6d. This finished and admired *Work of Genius* has been published by *Subscription*, the young Author having been encouraged by between Two or Three Hundred *Subscribers*; each contributing 2s. 6d. to his *Merit*. This *Work* may now be had of *Mr. Bew*, *Pater-noster-Row*, *London*; and of the celebrated Author at *Guildford*.

This young Author discovering an uncommon *Genius* for Poetry, wrote his first *Poem* on *Spring*, in 1772, when he was under 14 Years of Age; and all his succeeding Poems in the same *Work*, before he was 17, in 1776; being a Pattern of Poetical Composition and Literary Merit, worthy the *Example* of all our *British Youth*, at School, to inspire them with the same noble Emulation, to excel in Excellence, and to rival each other in the Love and Superiority of *Learning* and *Literary Arts*, for the Honor and Utility of the *British Nation*!

We consider this young *Bard* as of an amazing Capacity and *Genius*, without ever having seen or known him, but by his *Works*, doing an Honor to the *Royal Grammar School* at *Guildford*, and the ingenious *Master* thereof, the *Reverend Mr. COLE*, where, and under whom, this promising Youth was educated.

We are so warmed and surprized with reading the Productions of so young and rapid a *Genius*, which we cannot sufficiently admire, that we are excited to assert his Honor and Merit, from our Attachment to, and professed Regard for, *meritorious Science* in general.

Though the best Works are not without *Imperfections*, yet the Beauties and Charms of *Sylvæ* are so numerous, that if a Word or Two could be changed for others of greater Energy, Harmony, and Propriety (as these Poems are found to contain not a Word of *Bombast*, nor a Line of *Pedantry*) it would no more affect the Merit of the *Whole Performance*, than a Spot or Two on a beautiful *Lady's Face* would deform the Blaze of all her Beauty and Charms!—*Prior's* *Genius* was patronized, and so we hope to find, will our young Author's from more than we have yet discovered to be his Patrons.

“Seven Cities now contend for Homer dead,
“Thro’ which the living Homer begg’d for bread.”

For which the living *Homer* was nothing obliged to them,

As we find there are numerous *Gentlemen and Ladies* subscribing to *Hospitals* for the Relief of *abandoned Prostitutes*, so we hope to find them also subscribing to *Universities*, for improving and promoting Youth of Genius and Merit; whose *superior Talents* must be lost to the *British Nation*, without the Aid and Encouragement of the *Noble Spirited Benevolent*!

As to the modern *Critics* upon human *Science and Literature*, ignorant of the Subjects they take in Hand, (especially the Reviewers) they are of the same Use to Creation, and are to be alike considered, as *Gnats, Flies, Caterpillars, &c.* persecuting the *Innocent*, or preying upon the honest Industry of Others.

CONGRATULATORY ODE.

Addressed, by the PALLADIUM AUTHOR, to Mr. WILLIAM FARLEY, of the Royal Grammar School of Guildford, Surry, on reading his admired Miscellaneous Poems, intitled SYLVÆ, lately published.

Emulatio vincit, triumphat Homerus!

I.

FARLEY, all our Thoughts inspire!
Charm us with your Heav'nly Lyre!
To bold Raptures swell the Strain,
Sink to softest Notes again:

With Delights we'll fill the Bowl,
While to Joy you tune the Soul!
And intruding Cares controul.

II.

Gay Descriptions first will please,
To the Solemn rise from these;
Then to War's rough Clangors move,
Then repeat the Tales of Love:

Let Instruction fill your Lays,
You shall win immortal Praise,
You shall wear unfading Bays!

III.

Pope, like you *, began to sing,
When he prun'd young Fancy's Wing;
Wisdom o'er his Talents smil'd,
While He was but yet a Child;
As to ripen Years he grew,
He instructive Numbers knew,
And cou'd give Delight, like you!

* Under fourteen Years. He comes up to the Description of a Youth of Genius, of about fourteen Years, advertised for, in Verse, to be selected from the celebrated School of Christ's Hospital, of Royal Foundation by Edward VI. of famous Memory, in the Morning Chronicle, a London Paper of Saturday, Sept. 14, 1776, replied to in a Paper of the same Name, of Friday, Sept. 20, in an ostentatious Manner; respectfully answered by Honorius, in a Third Chronicle of Thursday, Oct. 3 following, with apparent Respect and honourable Intention; which was replied to by Philalethes, in a Fourth Paper of Saturday, Oct. 5, in an indecent Manner, forfeiting all Claim to the offered Prize; which was shortly answered in a Fifth and last Chronicle of Oct. 22, 1776, following, in Verse, in which all these Papers were written; shewing the Snake in the Benefactor's Bosom, instead of Merit and Gratitude discovered.

IV.

Wit and Sense his *Muse* attend,
Wisdom waiting as his Friend;
 He old *Homer's* Sense survey'd,
 You o'er *classic* Meads have stray'd;
 All the *Graces'* Charms combine
 To make your *sparkling Sylva* shine!
 To make your *tuneful Muse* divine!

V.

Genius, soon, in *Pope* took Place,
 In *Farley* shines with equal Grace!
 Fruit of *Genius*, streak'd with Gold,
 In *Sylva*, clustring, we behold!
 His ripe Productions, duteous bend,
 To ask a *patronizing* Friend;
 A Friend, whose *Friendship* ne'er will end.

VI.

Pope's Productions teem with Thought,
Farley's are with *Wisdom* fraught!
 Virtue watching as a Guard,
Pope's Productions found Reward;
 Praise and Honors rais'd his Fame!
 Shou'd not *Farley* find the same?
 Worth neglected gives to Shame.

VII.

Spring-Blooms * to *Autumn-Fruit* improve,
 As young *Desires* increase to Love;
 When *Farley* first *Maria* sings,
 He melts us with his tender Strings!
 But when he sounds *Fidelia's* Praise,
 He charms us with his changeful Lays!
 And all his *tuneful Art* displays!

VIII.

As when, of old, *Tymotheus'* Lyre
 Set ev'ry *gen'rous* Breast on Fire!
 To Raptures new, he changed his Theme,
 And warm'd each Breast with each Extreme!
 "So *Farley* is supremely blest,
 "Reclining on *Fidelia's* Breast!
 "Warm'd with chaste *seraphic* Fire,
 "In a *Maze* of Sweets expire!"

IX.

When his *Pindaric Muse* † is fir'd,
 By all the *Heav'nly Choir* inspir'd!
 On *Contemplation's* Wing he flies,
 And strikes us, awful, with Surprise!
 When *Grief* and *Woe* attend his Lay,
 His tender Strains our Tears obey,
 And *Pity* melts the Soul away!

* His First Poem, on Spring, was written when he was under Fourteen Years of Age, in 1772, which was followed by another Poem, on Autumn, written when he was but Sixteen Years old, in 1774.

"Varios ponit fœtus Autumnus." VIRG.

† See his Ode on the Nativity of Our Saviour, written when he was under Seventeen, in 1775, and translated into elegant Latin Verse, as Mr. Christo-

pher

X.

Again to Love he tunes his Lyre *,
With Love's soft Charms then all conspire.

" All must Cupid's Laws obey,
" All must own his lenient Sway ;
" Love, forever, reigns posselt,
" Monarch of each manly Breast."

XI.

But when *Fidelia* he invites to stay †,
Inclin'd to *Convents* and to *Priests* a Prey,
His *Muse*, persuasive, more her *Soul* can move,
" Than soothing *Ovid's* tender Strains of Love!"

His magic Verse the spotless Maid detains,
Without a Rival, on *Guildfordian* Plains !

The fair *Fidelia* rescu'd from all Harms,
O take her, *Farley*, blushing to your Arms,
In all her Bloom of Youth, and all her Beauty's Charms !

Portsmouth, Monday, July 21, 1777.

The above Stanzas are designed more to shew the Heart of a Friend than the Art of a Poet.

* Judgment and common Sense are so different from the enthusiastic Fire captivating of Sentiment, Fancy, and Metaphor ; besides the Eloquence and Elegance of combined *Distion*, required in poetical Composition, that it is hard to excell in any, or all these Respects, without being excelled by greater Excellence ; except in the First Rate *Geniuses* in Sentiment, Fancy, Wit, and Judgment, such as *Homer*, *Milton*, *Virgil*, *Pope*, *Farley*, &c. According to this Observation *Poesy* cannot admit of a *Second Sort*, with Approbation. So that every universally admired *Muse* must soar in Flights above the common Charms of Sense, and common Strains of Eloquence and Admiration ; even to captivating enthusiastic Rapture, and astonishing Sentiments ! It is this Excellence makes it so difficult to fix the Standard of true Sublime in poetical Sentiment and Composition, so as to make poetical Compositions unexceptionable : the Numbers, Harmony, Measure, and *Distion* being but the mere mechanical Part of the Art. Therefore, who would set up for Poets, except those who cannot be excelled in Sentiment, Eloquence, and *Distion* ? For neither common nor refined Sense are sufficient to entitle any Man to the Name of a Poet, any more than understanding the *Elements of Euclid*, the Principles and Elements of *Algebra* and *Fluxions*, &c. will intitle a Man to be a *Mathematician*. He must understand the most abstruse Relations and Properties of *Matter*, *Magnitude*, *Quantity*, and *Motion*, to be a real *Mathematician* ; as a Man must be versed in all the enchanting Ideas of Sentiment, Allegory, and Metaphor, by having made extensive Observation on natural Causes and Effects, or on the Works of Nature in general, besides having an inexhaustible Fund of Reading and classical Learning, to be a real Poet. Otherwise he will ascend no higher than a *Versifier*, or *Rhimester* ; and the Mathematician ascend no higher than a *Philomath*. A Hundred Dozen of *Versifiers*, *Philomaths*, and of *Dogmatists*,

C 2

pher Smart translated Pope's Ode on Cecilia's Birth Day, (to which this Ode is not esteemed inferior) into such Latin Verse, as made Mr. Pope say, that his English Ode would be taken for a Translation of Smart's Latin original Ode.

* See his Invitation to *Fidelia*.

† See his Verses addressed to *Fidelia* at the End of his Poems.

tists, will not make One real Poet, Mathematician, or Philosopher respectively. The Modern Poets, Mathematicians, and Philosophers, in Abundance, may be seen in *Mdazines* and *Critical Reviews*; while the real Sort, in one Age, are like the *Rara Avis in Terris, nigroque Simillima Signo*.
A Phoenix!

PALLADIUM AUTHOR.

TOPOGRAPHICAL GEOGRAPHY, continued.

FRANCE, Kingdom, W. of Rome.

Lat. Long. Length. Breadth. Sq. Mil. N° Inhabit.
42° to 51° N.—5° W. to 8° E.—600 m.—500 m.—131,095.—16,000,000.
Boundary.—Netherlands, N. Pyrennees, S. Italy, E. Biscay Bay, W.

DIVISIONS IV.

	17 Provinces.	Chief Towns.	5 Provinces.	Ch. Towns.
I. Northern.	Picardy, N.	Amiens.	Provence, S. E.	Aix.
	Isle of France, N.	Paris.	Languedoc, S.	Thouloufe.
	Champagne, N. E.	Troyes.	Guienne, W.	Bordeaux.
	Normandy, N. W.	Rouen.	Gafcony, S. W.	Auch.
	Bretany, W.	Rennes.	Rouffillon, S.	Perpignan.
II. Mid.			Dauphine, E. S. E.	Vienne.
	Orleanois, Middle	Orleans.	Burgundy, E.	Dijon.
	Lyonois, Middle	Lions.	Lorraine, N. E.	Nancy.
			Alface, E.	Straßburgh.
			Franche, Comté, E.	Befançon.

Chief Town, Paris.—Climate, IX.—Distance from London, 200 Miles, S. E.
—Inhabitants in Paris 600,000.

Title—K. of France and Navarre, Eldest Son of the Church, Most Christian Majesty.

Eldest Son—The Dauphin.—Coronation, Rheims.

Archbishops, 18.—Bishops, 107.—Universities, 26.—Orders, 4.

- | | |
|---|---|
| I. Archb. Lyons, Count and Primate of France. | Angoulême, Perigueux, Agen, Condom, Sarlat, Rochelle, Luçon. |
| Bps. 4. Autun, Langres, Macon, Chalon. | X. Auch. 10. Dax, Aire, Bazas, Bayonne, Cominges, Conserans, Lectoure, Lestarr, Oleron, Tarbes. |
| II. Sens, Primate of France & Germ. | XI. Thouloufe. 7. Pamiers, Mirepoix, Montauban, Lavaur, St. Papoul, Lombez, Brieux. |
| Bps. 3. Troyes, Auxerre, Nevers. | XII. Narbonne. 10. Carcassonne, Alet, Beziers, Agde, Lodeve, Montpellier, Nîmes, Uzès, St. Pons, Perpignan. |
| III. Paris, Duke and Peer of the Realm | XIII. Arles. 4. Marseilles, Orange, St. Paul 3 Chateaux, Toulon. |
| Bps. 3. Chartres, Orleans, Meaux. | XIV. Aix. 5. Apt, Riez, Frejus, Gap, Sisteron. |
| IV. Rheims, D. and Peer, Leg. of H. | XV. Avignon. 3. Carpentras, Vaison, Cavaillon. |
| Bps. 8. Soissons, Laon, Chalons, Noyons, Beauvais, Amiens, Senlis, Boulogne. | XVI. Vienne. 5. Valence and Die, Genève, Grenoble, Maurienne, Viviers. |
| V. Rouen, Primate of Normandy. | XVII. Befançon. 3. Basle, Laufanne, Belley. |
| Bps. 6. Bayeaux, Evreux, Avranches, Sées, Lisieux, Countances. | XVIII. Ambrun. 6. Digne, Nice, Glandeve, Vence, Senez, Grasse. |
| VI. Tours, 11. Mans, Rennes, Angers, Nantes, Cornouaille, Vannes, St. Malo, St. Brieux, Frequier, Leon, St. Pol, Dol. | |
| VII. Bourges. 5. Clermont, Limoges, St. Fleur, Le Puy, Tulle. | |
| VIII. Alby. 5. Castres, Mende, Rhodes, Cahors, Vabres. | |
| IX. Bourdeaux. 9. Poitiers, Saintes, | |

Universities,

Universities, 26.—Angers, Aix, Arles, Avignon, Befançon, Bourdeaux, Bourges, Caen, Cahors, Dole, Fleeche, Montauban, Montpellier, Nantes, Orange, Orleans, Paris, Perpignan, Poitiers, Pont a Mousson, Richlieu, Rheims, Soissons, Thoulouse, Tournon, Valence.

Orders, 4.—St. Michael, Holy Ghost, St. Lewis, St. Lazarus and Mount Carmel.

LAND AND WATER CONNECTIONS.

<i>Sea</i> , 1.—Mediterranean, E.	vergne, Cevennees, S.	
<i>Gulphs</i> , 1.—Gulph Lyons, S. E.	<i>Rivers</i> 11. <i>Rise. Course. Fall.</i>	
<i>Bays</i> , 3.—Biscay, W. Audierne, Quiberon, N. W.	Rhone, Valais, S.W. } Mediter-	
<i>Streights</i> , 1.—Calais, N.	Var, Alps, S. } ranean.	
<i>Isles</i> , 14.—Guernsey, Jersey, Alderney, N. W. Ushant, Belleisle, Poir-	Garonne, Pyren, N.W. } Biscay.	
moutier, W. Oleron, Rec, Oye,	Charante, Limosin, W. }	
<i>Mid. Porquerollos, Porteros, Le-</i>	Loire, Cevennes, N.W. }	
<i>vant, St. Honorat, St. Margaret, S.E.</i>	Adour, Gascony, E.to W. }	
<i>Capes</i> , 2.—Lahogue, Barfleur, N.	Seyne, Burgundy, } N.W. } English	
<i>Lakes</i> , 2.—Ilfoire, La Besse, S.	Soane, Picardy, } Channel	
<i>Mountains</i> , 6.—Alps, E. Pyrenees,	Rhine, Grifons, N. W. } Ger-	
S. W. Vauge, Jura, N. E. Au-	Meuse, Champagne, N. } man	
	Schelde, Picardy, N. E. } Ocean.	

S P A I N, Kingdom, S. W. of Rome.

Lat. Long. Length. Breadth. Sq. Mil. N° Inhab.
36° to 44° N.—3° E. to 10 W.—700^m—500^m—150,243—7,500,000.

Boundary.—Biscay Bay, N. Gibraltar Str. S. Mediterranean, E. Portugal, W.

DIVISIONS IV.

17 Provinces.	Ch. Towns.	Provinces.	Ch. Towns.
I. <i>No. 3.</i> Galicia, Compostella.	Compostella.	I. Valencia, Valencia.	Valencia.
Asturia, Oviedo.	Oviedo.	II. Murcia, Murcia.	Murcia.
Biscay, Bilbao.	Bilboa.	III. Granada, Granada.	Granada.
Navarre, Pampeluna.	Pampeluna.	IV. Andalusia, Seville.	Seville.
Arragon, Saragossa.	Saragossa.		
Catalonia, Barcelona.	Barcelona.		
Ivica, Ivica.	Ivica.		
Majorca, Majorca.	Majorca.		
Minorca, Cittadella.	Cittadella.		

Chief Town and Inauguration, Madrid—*Climate* VI.—*Distance from London*, 800 Miles. S.—*Inhabitants of Madrid*, 1,500,000.

Title.—King of all the Spains, Castille, Leon, Arragon, Navarre, Grenada, Toledo, Valencia, Galicia, Majorca, Seville, Cordoua, Murcia, Algarva, Gibraltar, Canaries, and West Indies; Emp. of Barcelona; Lord of Biscay and Molina; Grand Prior of Castille and Leon.

Eldest Son.—Prince of Asturias.

Archbishops, 8.—*Bishops*, 45.—*Universities*, 24.—*Orders*, 4.

I. *Archbp. Toledo*.—*Bps.* 8. Cordo- III. *Compostella*. 15. Salamanca, A-
na, Segovia, Carthagen, Siguenza, vila, Placentia, Lugos, Leon, Af-
Ofma, Cuenca, Jaen, Valladolid. torga, Zamora, Orense, Tuy, Ba-
II. *Burgos*. 3. Pampeluna, Palencia, dajos, Mondonede, Ceria, Ciudad,
Calahorra and Calzada. Rodrigo, Oviedo.

IV. *Seville*

IV. *Seville*. 3. Cadiz, Gaudier, Canaries.

V. *Granada*. 2. Malaga, Almeria.

VI. *Saragossa*. 6. Huesca, Jaca, Tarazona, Balbastro, Teruel, Albaracin.

VII. *Taragona*. 7. Barcelona, Girona, Lerida, Vich, Solsona, Urgel, Tortosa.

VIII. *Valentia*. 2. Majorca, Origuella.

Universities, 14.—Acala, Avila, Baeza, Cervera, Compostella, Gandia, Granada, Huesca, Lerida, Onata, Origuella, Osluna, Oviedo, Palencia, Pampeluna, Salamanca, Saragossa, Seville, Siguenza, Taragona, Toledo, Tortosa, Valencia, Valladolid.

Orders, 4.—Golden Fleece, St. James, Calatrava, Alcantara.

LAND and WATER CONNECTIONS.

<i>Seas</i> , 1.—Mediterranean.	<i>Rivers</i> , 12.	<i>Rise</i> .	<i>Course</i> .	<i>Fall</i> .
<i>Bays</i> , 13.—Biscay, Ferrol, Corunna, Vigo, N.W. Cadiz, Gibraltar, S.W. Carthagen, S. Alicant, Altea, Valencia, Roses, Majorca, Minorca, E.	Douro, Guadalquivir, Tago, Guadiana, Mondego, Zadao, Lima, Minho, Ebro, Guadalaviar, Segura, Yucar,	Old Castille, Mancha, New Castille, Guarda, Algarva, Gallicia, S. W. Old Castille, S. E. Arragon, S. W. Murcia, E. Valencia, W. to E.	W	Atlantic. Mediteranean S.
<i>Streights</i> , 1.—Gibraltar, S. W.				
<i>Capes</i> , 11.—Ortegai, Pannas, Machia, N. Ferrol, Bille, Finistire, N. W. Trafalgar, S. W. Gate, Palos, St. Martin, S. Creuse, E.				
<i>Mountains</i> , 8.—Pyrennees, N. E. Cantabrian, Molina, Tablada, N. Morrena, W. Navada, S. Calde, S. W.				

PORTUGAL, Kingdom, W. of Rome.

Lat. Long. Length. Breadth. Sq. Mil. N° Inhabit.
 37° to 42° N.—7° to 10° W.—30m—100m—27,851—2,000,000.
Boundary.—Spain, N. and E. Atlantic, S. and W.

DIVISIONS III.

<i>8 Provinces.</i>	<i>Ch. Towns.</i>	<i>Provinces.</i>	<i>Ch. Towns.</i>
I. N. 2. { Entreminhodouro, Braga.	4. { Entretajo, Evora.		
I. I. 2. { Tralofmontes, Miranda.	5. { Guadiana, Portalegre.		
I. M. 2. { Beira, Coimbra.	6. { Alentejo, Lagos.		
I. N. 2. { Estramadura, Lisbon.	7. { Algarva, Faro.		

Chief Town, Lisbon.—*Climate*, VI.—*Dist. from London*, 850 Miles S. W.
Inhabitants of Lisbon, 160,000.

Title.—King of Portugal and Algarvas; Lord of Guinea; Navigation, Conquest and Commerce of Ethiopia, Arabia, Persia, India, and Brazil; Most Faithful Majesty.

Eldest Son.—Prince of Brazil.

Archbishops, 3.—*Bishops*, 18.—*Universities*, 3.—*Orders*, 3.

I. *Archb.* Braga.—*Bishops*, 5. Porto, Guarda, Viseo, Lamego, Miranda.

II. *Archb.* Patriarch Lisbon.—*Bishops*, 11. Coimbra, Elvas, Leiria, Portalegre, Ceuta, Funchal, Angra, St. Salvador, Angola, Ribera Grande, St. Tome.

III. *Archb.* Evora.—*Bps.* 2. Faro, Tanger united Ceuta.

Universities, 3.—Lisbon, Evora, Coimbra.

Orders, 3.—Christ, Avis, St. James.

Seas and Bays, 3.—Atlantic Ocean, W. St. Ubes, W. Lagos, S.

Capes, 5.—La Rocca, Espichal, Mondego, W. St. Vincent, St. Mary, S. W.

Rivers.—See Spain.

ITALY.

ITALY, consisting of STATES, S. of Rome.

Lat. Long. Length. Breadth. Sq. Mil. N^o Inhabit.
 38° to 47 N. — 6° to 19 E. — 600^m. — 400ⁱⁿ. — 75,576. — 10,000,000

Boundary.—Alps, N. Mediterranean, S. Adriatic, E. France, W.

DIVISIONS IV.

	21 States.	Ch. Towns.		States.	Ch. Towns.
I. Northern, 9.	Savoy, D.	Chamberry.	4	Naples, K.	Naples.
	Piedmont, Pr.	Turin.		Sicily,	Palermo.
	Montferrat, D.	Casal.		Lipari,	Lipari.
	Milanesé, D.	Milan.		Malta,	Valetta.
	Parmesano, D.	Parma.	III. S. 2.	Sardinia, K.	Cagliari.
	Modenesé, D.	Modena.			
	Mantovano, D.	Mantua.	IV. W. 2.	Corfica,	Bastia.
	Veneziano, R.	Venice.			
	Genoesé, R.	Genoa.			
	Pope's Dominion,	Rome.			
II. Middle, 6.	Tuscany, D.	Florence.			
	Lucchesé, R.	Lucca.			
	St. Marino, R.	St. Marino.			
	Piombino, Pr.	Piombino.			
	Monacho, Pr.	Monacho.			

Chief Town, Rome.—Climate, VII.—Distance from London, 820^m, S. E.—
 Inhabitants of Rome, 150,000.

Title.—King of Sardinia and Cyprus; D. of Savoy, Montferrat, Aosta, Chablais, and Genevois; Prince of Piedmont, Achaia, Morea, and Oneglia; M. of Italy, Saluzzo, and Ivrea; E. of Maurienne, Nice, Tende, Afté, and Pavia; B. of Fauffigni and Vaud; Lord of Vercelli, Pignerol, Tarantaise, Friburg, Marro, Piella and Novella; Pr. and Perpetual Vicar of the Empire in Italy.

Eldest Son.—D. of Savoy, and Pr. Royal of Sardinia.

Naples.—K. of Jerusalem, the Two Sicilies, Apulia, and Carpua; D. of Calabria, and Pr. of Tarento.

Eldest Son.—Pr. Royal of the Two Sicilies; D. of Calabria.

Duke of Modena.—Reggio, and Mirandola; Pr. of Novellara and Correggio; M. of Este and Concordia; E. of Carpi; Vice Governor of Lombardy.

Eldest Son.—Prince Hereditary of Modena.

Duke of Parma, Placentia and Guastalla; Grand Prior of Castille and Leon; Gr. Admiral of Spain and the Indies.

Eldest Son.—Pr. Hereditary of Parma.

Prince of Monaco; D. of Valentinois; Peer of France; Lord of Estouville; M. of Beaux; E. of Carladez and Thorigny.

Eldest Son.—Duke of Valentinois.

The Pope.—Sovereign Pontiff of the Universal and Patriarch of the W. Church; Bishop and Lord of Rome.

WATER and LAND CONNECTIONS.

Seas, 3.—Mediterranean, S. E. Adriatic, E. Tuscany, N. W.
 Gulphs, 5.—Genoa, N. W. Taranto, Squillace, Naples, Catania, S.
 Bays, 2.—Bastia, Cagliari, W.
 Straights, 2.—Messina, S. Bonifacio, W.
 Capes, 4.—Corfo, N. W. Spartivento, S. E. Passaro, Trapano, S.

Lakes, 9.—Maggiore, Como, Garda, Lugano, N. Perugia, Terni, Bracciano, Celano, Midd.

Mountains, 4.—Alps, N. W. Appennine, E. to W. Vesuvius, S. E. Atna, S.

Rivers,

Rivers, 12.	Rise.	Course.	Fall.	Rivers.	Rise.	Course.	Fall.
Po,	Piedmont, N.		} Adriatic S.	Tyber,	} Appenine	{ S. W. } S. } S. } W. Tuscan, S. } S.E. } Po.	} Medi- terran.
Adige,	Tirol, S. E.			Velturmo,			
Rubicon,	Appenine, E.			Var,			
Tagliamenta,	} Alps, S. E.			Arno,			
Piava,				Oglio,			
Brenta,				Doria,			

Archbishops, 42.—Bishops, 263.—Universities, 18.—Orders, 12.

- I. *Pontif of Rome. Bps. 45.* Ostia and Velletri, Porto, Sabina, Frascati, Albano, Tivoli, Anagni, Segno, Forentino, Alatri, Veroli, Terracina, Nepi and Sutri, Viterbo and Toscanella, Orti and Civita Castellana, Corneto and Monte Fiascone, Bagnarea, Orvieto, Perugia, Aquapendente, Spoleto, Terni, Citta di Castello, Cittadella Pieve, Narni, Amelia, Todi, Rieti, Foligni, Assisi, Marli, Nocera, Arezzo, Ancona, Loreto and Recanati, Jesi, Ascoli, Osimo, Camerino, Fano, Aquila, Civita Ducale, Valva and Sulmona, Teramo.
- II. *Archbp. Fermo.—Bps. 4.* Maccraro & Tolentino, Ripa * Transone, Montalto, San Severino.
- III. *Urbino. 7.* Cagli, Fossombrone, Pesaro, Monte Feltro, Sinigaglia, Urbanea and St. Angelo, Gubbio.
- IV. *Ravenna. 11.* Adria, Rimini, Bertinoro, Cervia, Cesenna, Comacchio, Faenza, Ferrara, Imola, Forli, Sarfina.
- V. *Bologna. 6.* Parma, Piacenza, Borgo St. Domino, Reggio, Modena, Crema.
- VI. *Benevento. 17.* Ascoli, Telese, St. Agatha, Alife, Montemarano, Avellino and Fricenta, * Ariano, Vico Baronica, Trivento, * Bojano, Larino, Bovino, Volturara, Termine, Lucera, Guardia, Alferes, S. Severo.
- VII. *Turin. 4.* Ivera, Mondovi, Saluzzo, * Fossano.
- VIII. *Cagliari. 1.* Villa d'Iglesias.
- IX. *Oristagni. 1.* Ales.
- X. *Sassari. 3.* Algeri, Bosa, Castell Aragonese.
- XI. *Tarantese. 2.* Austa, Sion.
- XII. *Millan. 16.* Cremona, Novara, Lodi, Allefandria, Tortona, Vigevano, Pavia, * Bergamo, Brescia, Alba, Asti, Vercelli, Aquis, Casale, Savona, Ventimiglia.
- XIII. *Gobizia. 6.* Trento, Como, Trieste, Pedena, Mantua, Laubach.
- XIV. *Venice, Patr. 3.* Chiozza, Torcello, Caorle.
- XV. *Udine. 12.* Padua, Vicenza, Verona, Trevigi, Ceneda, Belluno, Feltre, Concordia, Capo d'Istria, Citta Nova, Parenzo, Pola.
- XVI. *Genoa. 6.* Albenga, Noli, Brugnato, Nebia, Mariana and Accia, Bobio.
- XVII. *Pisa. 5.* Aleria, Ajazzo, Sagona, Lucca, * Sarzana.
- XVIII. *Florence. 8.* Fiesole, Pistoja and Prato, Volterra, * Colle St. Miniato, Borgo, St. Sepolcro, Cortona, Monte Pulciano.
- XIX. *Sienna. 6.* Aona, Chiufi, Grosseto, Massa, Pienza, * Mont-Alcino.
- XX. *Naples. 5.* Positano, Nolo, Cerra, Ischia, Aversa.
- XXI. *Capua. 12.* Tiano, Calvi, Caserta, Cajazzo, * Carniola, Isernia, Sueffa, Aquino, * Venafro, Gaeta, * Fondi, * Sera.
- XXII. *Solerno. 9.* Campagna, Capaccio, Policastro, Nusco, Sarno, Marfisco, Nocera, Acerno, Cava.
- XXIII. *Amalfi. 4.* Lettere, Capri, Minori, Scala * and Ravello.
- XXIV. *Sorrento. 3.* Vico, Massa, Castell a' Mare.
- XXV. *Conza. 4.* Muro, Satriano, Lacedogna, Saint Angelo and Bisaccia.
- XXVI. *Matera. 7.* Venosa, Turri, Potenza, Gravina, Tricarico, Montepoloso, * Melfi * and Rapolla.
- XXVII. *Taranto. 3.* Motola, Castellaneta, Oria.
- XXVIII. *Brindisi. 1.* Ostuni.
- XXIX. *Otranto. 6.* Castro, Gallipoli, Ugento, Lecce, Alefiano, Nardo.

XXX

XXX. *Bari*. 11. Bitonto, Giovenazzo, Ruvo, Molfeta,* Conversano, Minervino, Monopoli,* Bitetto, Polignano, Levello, Cataro.

XXXI. *Tarni*. 2. Befeglia, Andria.

XXXII. *Barleta*. 1. Monte Verde.

XXXIII. *Manferdonia*. 2. Vieste, Troja.*

XXXIV. *Lanciano*. Chieti. 2. Atri* and Penna,* Ortona and Campi.

XXXV. *Rossano*. 1. Bisignano.

XXXVI. *Cosenza*. 4. Mortorano, St. Marco,* Melito,* Cassano.*

Universities, 18.—Bologna, Cagliari, Catania, Ferrara, Firenze, Macerata, Mantua, Milano, Messina, Napoli, Padua, Pavia, Perugia, Pisa, Roma, Salerno, Sienna, Turino.

Orders, 12.—St. John, *Malta*; Christ, St. John Lateran, *Rome*; Annunciata, St. Maurice and Lazarus, *Sardinia*; St. Januarius, *Sicily*; Golden Cross, St. Mark, Doge, *Venice*; St. Stephen, *Tuscany*; St. George, *Parma*; Blood of Christ, *Mantua*.

XXXVII. *S. Severino*. 5. Umbriatico, Belcastro, Strongoli, Isola, Cerenza and Cariati.

XXXVIII. *Reggio*. 9. Catanzaro, Catrone, Tropea, Oppido, Nicotera, Neocastro, Geraci, Squillace, Bova.

XXXIX. *Palermo*. 2. Mazari, Malta.

XL. *Messina*. 3. Cefalu, Patti, Lipari.

XLI. *Monreale*. 2. Catanica, Syracusa.

N. B. Lanciano and Chieti, are sometimes reckoned but One *Archbp.* which separately reckoned make 42 *Archbps.* with the *Pontificate of Rome*.

TURKEY, an Empire, S. E. of Rome.

Lat. Long. Length. Breadth. Sq. Miles. Inhabit.
36° to 46° N.—17° to 40° E.—1900^m—900^m—960,057—8,000,000.
Boundary.—Russia, N. Circassia, E. Mediterranean, S. W.

Divisions IV.—*Subdivisions* 14.—*Chief Towns* 14.

<i>Subdivisions.</i>	<i>Ch. Towns.</i>	<i>Subdivisions.</i>	<i>Ch. Towns.</i>
1. Moldavia,	Jassy.	1. Bulgaria,	Widin.
2. Budzjac,	Oczakow.	2. Romania,	Constantinople
3. Crimea,	Precop.	3. Morea,	Corinth.
4. Walachia,	Tergovise.	4. Achaia,	Athens.
5. Dalmatia,	Herzegovina.	5. Albania,	Dulcigno.
6. Bosnia,	Serajo.	6. Meccedonia,	Strymon.
7. Servia,	Belgrade.	7. Archipelago,	Iles.

Title.—Grand Signior, Emperor of the East, Sultan.

Chief Town, Constantinople.—*Climate*, VII.—*Distance from London*, 1320 Miles, S. E.—*Inhabitants in Constantinople*, 620,000.

LAND and WATER CONNECTIONS.

Seas, 8.—Asoph, N. E. Euxine, Levant, Marmora, E. Archipelago, S. E. Mediterranean, S. Adriatic, W. Ionian, S. W.

Gulphs, S. E. 14.—Solonichi, Contessa, Magnesia, Guereto, Smyrna, Ephesus, Satalia, Lepanto, Engia, Napoli, Colochina, Samos, Stanchio, Negropont.

Straits, 2.—Hellepont, Bosphorus, E.

Isthmus—of Corinth, S. E.

Lakes, 6.—Scutari, Plave, Holti, W. Stymphalus, Pencus, Styz, S. E.

Iles, 24. Hereafter. See End of Europe.

Archbishops, 27.—Bishops, 78.—Patriarchs, 4.

*Archbishops, 20.—Adrianople, Amasia, Amphipolis, Athens, Berytus, Chalcedon, Corinth, Heraclea, Janna, Larissa, Malvasia, Napoli, Nicofia, Ocri-
da, Patras, Salonichi, Proconesus, Sophia, Tarfa, Tyre.*

Bishops, 40.—Acre, Amasia, Amphissa, Ancyra, Andros, Argiro, Castro, Argos, Belgrade, Butrinto, Cassa, Caminitza, Cefaria, Christianople, Cogni, Cyzicus, Delvino, Drama, Ephesus, Glykeon, Gothia, Granitza, Livadia, Milo, Mistra, Modon, Mitilene, Narenza, Nice, Nicomedia, Rhodes, Solona, Santorini, Scio, Scotusa, Syra, Talanta, Termia, Trebifond, Zagrab.

Archbp. Zara. Bps. 3.—Arbe, Veglia, Osfero.

Spalatro Almiffa. 8.—Segna, Nona, Liefina, Traou, Scardona, Tine, Macarica, Sebenico.

Ragusa. 6.—Stagno, Merca and Trebigni, Narenta, Brazza, Rifano, Curzola.

*Anfiveri. 10.—Scutari, Pulati, Drivasto, Dulcigno, Sappa and Sardan-
nia, Priferen, Semendria, Nandor, Alba, Budua.*

Durazzo. 5.—Alessio, Lifs, Benda, Canovia, Croja.

Curfu. 1.—Zante and Cephalonia.

Candia. 4.—Canea, Retimo and Milopotamo, Sethia and Hiera Petra, Sichimo and Arcadi.

HUNGARY, Kingdom, E. of Rome.

Lat. Long. Length. Breadth. Sq Miles. Inhabitants.
45 to 49° N.—17 to 23° E.—300^m—200^m—36,060—3,000,000

Boundary.—Poland, N. Slavonia, S. Transilvania, E. Austria, W.

<i>Divisions 6.</i>	<i>Ch. Towns.</i>	<i>Rivers, 8.</i>	<i>Rise.</i>	<i>Course.</i>	<i>Fall.</i>
Hungary { Upper, N.	Presburgh.	Merith, Transylvania,	W to E.	} The- ysse.	} Da- nube.
Lower, S.	Buda.	Kaloo, Upper Hungary,	S.		
Transilvania, E.	Hermanstat.	Raab, Stiria,	N. E.		
Slavonia, S. W.	Pofega.	Waag, Up. Hungary,	S. W.		
Croatia, W.	Carlstadt.	Temes, Irongate,	W.		
Morlachia, S. E.	Segna.	Danube,			

Title.—See Germany.

Chief Town and Coronation Place.—
Presburgh.

Climate IX.—Distance from London,
800^m E.—*Inhabitants in Presburgh,*
35,000.

*Lakes, 3.—Boker, Platten, New Sid-
ler, S. W.*

*Mountains, 2.—Carpathian, N. E.
Irongate, S.*

Drave, } See Germany.
Theyssle, }

Archbishops, 2.—Bishops, 11.—Universit.

*Archb. Gran. Bps. 6.—Nitza, Raab,
Agria, Vefprin, Watzem, Five
Churches.*

*Chlotza. Bps. 5.—Zagrab, Wa-
radin, Sirmich, Chonat, Herman-
stat.*

University.—Weiffenberg.

SWITZERLAND, Republic, Middle.

Long. Lat. Length. Breadth. Sq. Miles. Inhabitants.
45° to 49° N.—6° to 11° E.—260^m—100^m—12,884—2,000,000.

Boundary.—Alface, N. Tirol, E. Italy, S. W.

Divisions, 3.—Subdivisions, 13.—Cantons, 13.—Allies, 6.

I. Eop

Cantons.		Ch. Towns.	Title.—Helvetic Body.
I. East.	Sub. 3.	Scaffhausen,	Scaffhausen.
		Zurich,	Zurich.
		Appenzel,	Appenzel.
II. Mid.	Sub. 5.	Zug,	Zug.
		Swiss,	Swiss.
		Glaris,	Glaris.
		Uri,	Altorf.
		Underwald,	Stantz.
III.	Western	Berne,	Berne.
		Basil,	Basil.
		Lucern,	Lucern.
Sub. 5.		Friburgh,	Friburgh.
		Solothern,	Soleure.
		Mulhausen, N.	Mulhausen.
Allies to Swit- zerland.	Subdivisions 6.	St. Gall, E.	St. Gall.
		Grisons, S. E.	Coire.
		Valais, S. W.	Syon.
		Neuchatel, N.W.	Neuchatel.
		Geneva, W.	Geneva.
			Chief Town, Berne.—Climate, VIII. —Distance from London, 420 Miles, S.E.—Inhabitants, 8,000. Lakes, 7.—Lucern, Mid. Geneva, W. Constance, N.E. Zurich, N. Neuf- chatel, Bienne, Thun, N.W. Mountains, 4.—Alps, S. Jura, W. St. Bernard, St. Gothard, S. Rivers, 6. Rife. Course. Fall. Aaar, } Grisons, N. E. Rhine. Rufs, } Rhine, } See France. Rhone, } Inn, See Germany. Oglio, See Italy. Universities, 5.—Basil, Berne, Gene- va, Laufanne, Zurich.

GERMANY, Empire, E. of Rome.

Lat.	Long.	Length.	Breadth.	Sq. Mil.	Inhabitants.
45 to 55° N.	5 to 19° E.	600 ^m	500 ^m	238,808	24,000,000.
Boundary.—German Sea, N. Switzerland, S. Poland, E. Netherlands, W.					

DIVISIONS III.

Circles. 9.	Ch. Towns.	Empire of France.
I. N. 3. {	Upper Saxony,	Dresden.
	Lower Saxony,	Magdeburgh
	Westphalia,	Munster.
II. W. 3. {	Upper Rhine,	Francfort.
	Lower Rhine,	Heidelburgh
	Franconia,	Nuremberg.
III. S. 3. {	Austria,	Vienna.
	Bavaria,	Munich.
	Swabia,	Augsburg.
Title.—Emperor of Germany, King of the Romans, Titular Duke of Lorrain and Bar.		3. <i>Abp. of Cologne.</i> —Chancellor of the Empire in Italy.
Eldest Son.—Arch Duke of Austria.		4. <i>King of Bohemia.</i> —Cup Bearer.
Empress Queen Dowager of Germany, Hungary, and Bohemia, Arch		5. <i>Elect. of Bavaria.</i> —Grand Sewer.
		6. <i>El. of Saxony.</i> —Grand Marshal of the Empire.
		7. <i>Elect. of Brandenburg.</i> —Grand Chamberlain.
		8. <i>El. Palatine.</i> —Grand Steward.
		9. <i>El. of Hanover.</i> —Arch Treasurer of the Holy Roman Empire.
		<i>Chief Town, Vienna.</i> —Climate, VIII.
		—Distance from London 600 Miles
		E.— <i>Inhabitants, 300,000.</i>
		<i>Coronation Place, Francfort.</i>

LAND and WATER CONNECTIONS.

Seas, 2.—German, N. Baltic, E.			
Lakes, 4.—Constance, W. Bregentz,			
E. Chiemsee, E. Zecknitzsee, S.E.			
Mountains, 2.—Alps, Schwartzwald, S.			
Rivers 24.		Rife. Course. Fall.	
Danube,		Swabia, N. E. Bla. Sea.	
Rhine,		Grisons, } N.W.	
Elbe,		Silesia, } N.W.	
Ems,		Munster, N. } Moraw,	
D			

Rivers.	Rise.	Course.	Fall.		
Moraw,	Moravia,	N. to S.	Danube.	Archbp. Mentz. 13.—Ausbürg, Spire,	
Iser,	Tyrol,	E.		Worms, Straßburg, Wurtzburg,	
Drave,	Bavaria,			Aichstadt, Verden, Coire, Hilde-	
Save,	Carniola,			shelm, Paderborn, Constance, Hal-	
Theyffe,	Hungary,	S.		berstat, Bamberg *.	
Atlanta,	Turkey,			Treves, 3.—Metz, Toul, Verdun.	
Pruth,	Waldavia,		Cologne, 3.—Liege, Munster, Osnabrug.		
Lech,	Grifons,	N. E.	Rhine.	Salzburg, 8.—Freisingen, Ratibonne,*	
Inn,				Passlaw, Chiemiée, Seckaw, Lavant,	
Havel,	Meeklenb.	N. W.		Brixen, Gureke.	
Muldaw,	Bohemia,			Vienna, 1.—Newstat.	
Elmenau,	Zell,			Universities, 19.—Altorf, Cologne, Dil-	
Moselle,	Lorrain,	N. E.	Rhine.	lingen, Erfurt, Francfort, Friburg,	
Main,	Fraconia,	W.		Gießen, Göttingen, Gratz, Gripl-	
Neckar,	Swabia,			walt, Heidelberg, Helmstat, Jena,	
Lhon,	Hesse,	S. W.		Ingolstat, Kiel, Lawingen, Leipzig,	
Roer,	Westphalia,	W.	Rhine.	Liege, Mentz.	
Lippe,				Orders, 7.—Golden Fleece, Maria	
Spree,	Lusatia,	S. to N.		Theresa, Starry Cross, Empire.—	
Pene,	Pomerania,	W. to E.		St. George, Bavaria.—St. Hubert,	
Archbishops,	2.—Bishops, 28.—Uni-			Palat.—St. Michael Archangel,	
versities,	19.—Orders, 7.			Cologne.—La Chasse, Wirtemb.—	
				St. Ann, Holstein Gottorp.	

POLAND, Kingdom, Middle.

Lat.	Long.	Length.	Breadth.	Sq. Miles.	Inhabitants.
46° to 57° N.	16° to 34° E.	700 ^m	680	222,000	11,000,000.
Boundary.—Livonia, N. Turkey, S. Muscovy, E. Germany, W.					
Divisions, 12.	Ch. Towns.	LAND and WATER CONNECTIONS.			
Lithuania, S.	Wilna.	Seas and Gulphs, 3.—Baltick, N. W.			
Podolia, } S. E.	{ Caminieck.	Livonia, N. Dantzick, W.			
Volhinia, } S. E.	{ Lucko.	Bays, 2.—Curish-Haff, N. Frisch-Haff, W			
Red Russia, S. W.	Lemburg.	Capes, 2.—Klein, Urben, N.			
Great Poland, } W.	{ Gnesna.	Lakes, 2.—Gopto, W. Olha, E.			
Little Poland, } W.	{ Cracow.	Mountains, 1.—Carpathian, S.			
Warsovia, } Middle	{ Warsaw.	Rivers, 7. Rise. Course. Fall.			
Polesia, } Middle	{ Bressel.	Dwina, } Lithuania, W. } Baltic.			
Polachia, } Middle	{ Bichi.	Wilna, } Lithuania, W. } Baltic.			
Samogitia, N.	Rasiem,	Vistula, Silesia, N. }			
Prussia, N. W.	Elbing.	Nieper, Moscow, } S. E. Black Sea.			
Courland, N.	Mittaw.	Niefter, Red Russia }			
		Warta, Cracow, E. to W. Oden.			
		Bog, Volhinia, S. E. Nieper.			

Title.—King of Poland, G. Duke of
Lithuania, D. of Russia, Prussia,
Warsovia, Samogitia, Kiovia, Vol-
hinia, Podolia, Polachia, Livonia,
Smolensko and Czernikow.

Chief Town, Warsaw.—Climate, IX.
Distance from London, 760 E.—
Inhabitants in Warsaw, 40,000.—
Coronation Place, Cracow,

Abps. 2.—Bps. 17.—Univ. 3.—Ord. 2.
Genesna.—B. 13. Cracow, Vilenski,
Pofnania, Ploczko, Warmia* and
Samland*, Luckow, Samodska, Zem-
blin, Culm and Pomesan, Breslaw,
Lebus, Camin, Smolensko.
Lemberg.—Bps. 4. Przemyzel, Chelm,
Riof, Caminiecc.
Universities, 3.—Cracow, Elbing, Wilna.
Orders, 2.—White Eagle, S. Henry.

PRUS.

PRUSSIA, Kingdom, N. W. of Rome.

Lat.	Long.	Length.	Breadth.	Sq. Miles.	Inhabit.
53° to 55 N.—	20° to 23 E.—	200 ^m —	120 ^m —	34,771.—	600,000.
Boundary.—Samogitia, N. Warsovia, S. Lithuania, E. Baltic, W.					
Divisions, VI.—Subdivisions, 16.—No Archbishops or Bishops, the King all.—					
University, 1.—Order, 1.					
I. Pol. N. W. Sub. 1.	Prussia, Koningsb.	Title.—K. of Prussia, Magdeburg, and El. of Brandenburg; Chamberlain of the Empire; D. of Cleves, Magdeburg, Pomerania, and Guelderland.			
II. Sax. N. E. Subdivis. 5.	Brandenberg,	Berlin.	Eldest Son.—Prince Royal.		
	Pomerania,	Camin.	Chief Town & Coronation.—Coningsb.		
	Swed. Pomeran.	Stetin.	Climate, IX.—Distance from London,		
	Magdeburg,	Magdeburg.	940 E.—Inhab. in Coningf. 56,000.		
	Halberstadt,	Halberstadt.	LAND and WATER CONNECTIONS.		
III. Boh. E. Subd. 2.	Glatz,	Glatz.	Seas, Gulphs, and Bays.—See Poland,		
	Silesia,	Breslaw.	Germany, and Netherlands.		
	Minden,	Minden.	Lake, 1.—Spirding, N.		
	Ravensburg,	Ravensburg.	Rivers, 3. Rise. Course. Fall.		
	Lingen,	Lingen.	Niemed, } Lithuania, N. W. Baltic.		
IV. West. N. W. Subdivisions 6.	Cleves,	Cleves.	Pregel, } Vistula. See Poland.		
	Meurs,	Meurs.	University, 1.—Koningsberg.		
	Mark,	Ham.	Order, 1.—Black Eagle.		
	V. Neth. W. Subd. 1.	Guelderl. Guedres.			
	VI. Swit. W. Subd. 1.	Neufchatel, Neufchatel.			

BOHEMIA, Kingdom, Middle.

Lat.	Long.	Length.	Breadth.	Sq.Miles.	Inhabitants.
48° to 52 N.—	12° to 19 E.—	300 ^m —	220 ^m —	13,060.—	3,000,000.
Boundary.—Saxony, N. Austria, S. Poland, E. Bavaria, W.					
Divisions, 3.—Archbbs. 1.—Bps. 3.—University, 1.—No Order.					
Ch. Towns. LAND and WATER CONNECTIONS.					
Bohemia, Prop. W.	Prague.	Mountains, 2.—Fishtelb. Zottenb. N.E.			
Silesia, E.	Breslaw.	Rivers, 6. Rise. Course. Fall.			
Moravia, S.	Olmütz.	Elbe, Silesia, N.W. Ger.Ocean.			
Title.—See Germany.		Muldaw, Austria, N. } Elbe.			
Chief Town and Coronation Place.—		Eger, Frane. W. to E. }			
Prague.		Moraw, Moravia, N. to S. Danube.			
Climate, IX.—Distance from London,					
600 Miles E.—Inhabitants in Prague,					
83,000.					
Abp. Prague.—Bps. 3. Olmutz, Leutmeritz, Coniggratz.					
University, 1.—Prague.					

NETHERLANDS, W. of Rome.

Lat.	Long.	Length.	Breadth.	Sq. Miles.	Inhabitants.
49° to 52 N.—	2° to 7 E.—	200 ^m —	200 ^m —	12,968.—	5,000,000.
Boundary.—Holland, N. Lorrain, S. Germany, E. English Channel, W.					
Provinces, 10.—Archbishops, 1.—Bishops, 5.—Universities, 2.—No Order					
Provinces. Ch. Towns. Provinces. Ch. Towns.					
1. Bravant, { Dutch, N. Boileduc. 3. Malines, Mid. Mecklin					
2. Antwerp, N. { Austrian, Mid. Brussels. 4. Limburg, S. E. Limburg.					
3. Antwerp, N. Antwerp. 5. Luxemburg, S. E. Luxemburg					
6. Namur,					

6. Namur,			Namur.	Rivers, 10.	Rise.	Course.	Fall.
7. Hainault,	{ Aust. } Mid.		Mons.	Sambre,	Picardy,	N. E.	Maese.
8. Cambes,	{ Fr. } Mid.		Valencien.	Scarp & Lis,	Artois,	N. E.	
9. Artois	{ W. } Mid.		Cambray.	Demer,	Liegeois,	W.	
10. Flan-	{ Dutch } W.		Arras.	Dyle,			
ders.	{ Aust. } W.		Sluys.	Ripple,			
	{ Frenc } W.		Ghent.	Dender,			
			Douay.	Geet,			
Chief Town, Brussels.—Climate, IX.				Maese & Scheld, See Holland.			
—Distance fr. Lond. 180 Mil S. E.				Archbp. Mecklin.—Bps. 5. Antwerp,			
LAND and WATER CONNECTIONS.				Bruges, Ghent, Ypres, Ruremonde.			
Seas, 1.—German, N.				Universities, 2.—Louvain, Douay.			
Canals, 3.—Brussels, Ghent, Osten. N. W.							

HOLLAND, Republic, W. of Rome.

Lat.	Long.	Length.	Breadth.	Sq. Mil.	Inhabitants.
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51° to 54 N.—3° to 7 E.—150^m.—100^m.—7546.—2,000,000.

Boundary.—German Sea, N. Flanders, S. Westphalia, E. Germ. Sea, W.

Divisions, 7.—Universities, 5.—No Archbishops or Bishops.

United Provinces, 7.	Ch. Towns.	Chief Town, Amsterdam.—Climate,
1. Holland, S.	Amsterdam.	IX.—Distance from London, 118
2. Overysfel, E.	Deventer.	Miles E.—Inhabitants in Amster-
3. Gueldert, and } S. E. {	Nimeguen	dam, 212,000.
Zutphen,	Zutphen.	LAND and WATER CONNECTIONS.
4. Friesland, N. E.	Lewarden.	Seas, 4.—German, N. W. Zuyder, N.
5. Groningen, N. E.	Groningen.	Ziro, Texel, N.
6. Utrecht, Middle,	Utrecht.	Meers, 1.—Harlem, N. W.
7. Zealand, S. W.	Middlebergh	Rivers, 6. Rise. Course. Fall.

Title.—The Stadholder, Prince of Orange, Nassau Dietz; Capt. Gen. and Admiral to their High Mightinesses the States General; M. of Flushing; Earl of Vianden, Striegeberg and Bergen; Barron of Breda and Grave.

DENMARK, Kingdom, N. W. of Rome.

Lat.	Long.	Length.	Breadth.	Sq. Miles.	Inhabitants.
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54° to 58 N.—8° to 13 E.—240^m.—180.—63,200.—1,229,000.

Boundary.—Scaggerac, N. Baltic, S. Sound, E. German Ocean, W.

Divisions, 9.—Archbishops, 1.—Bishops, 7.—Universities, 1.—Orders, 2.

Divisions, 9.	Ch. Towns.	Title.—K. of Denmark and Norway,
1. Jutland, W.	Wyburgh.	of the Goths and Vandals; Duke of
2. Sleswick, S. W.	Sleswick.	Sleswick, Holstein, Stormur and
3. Zealand,	Copenhagen	Ditmarsh; Earl of Oldenburgh
4. Tunen,	Odenfee.	and Delmenhurst.
5. Falster,	Nikoping.	Eldest Son.—Prince Royal.
6. Laland,	Naxkow.	Chief Town and Coronation Place.—Co-
7. Alsen,	Sunderburg	penhagen.—Climate, X.—Dist. fr.
8. Mona,	Steke.	London, 500 Miles N. E.—Inhabi-
9. Bornholm,	Sandewick.	tants in Copenhagen, 77,560.

LAND

ANNUAL MISCELLANY, 1778.

28

LAND and WATER CONNE CTIONS.

Seas, 3.—Categate, N. Baltic, E. German, W.
Gulphs, 2.—Lymburg, N. W. Finland, E.
Streights, 3.—Great and Little Belt, W. Sound, E.

Rivers, 2, *Rise. Course. Fall.*
 Eyder & Tron, Sleswick, E. to W. Ger. O.
 Trave, Holstein, E. Baltic.
Arbp. Copenhagen.—*Bps.* 7. Sleswick, Athusen, Alburg, Ripen, Wyburg, Odenfse, Roschild.
University, 1.—Copenhagen.
Orders, 2.—Elephant, Danebrug.

NORWAY, Kingdom, N. W. of Rome.

Lat.	Long.	Length.	Breadth.	Sq. Miles.	Inhabit.
58° to 68 N.	5° to 15 E.	1000 m.	300 m.	99,800.	700,000.
<i>Boundary</i> .—North. Oc. N. Categate, S. Dofrine Hills, E. North. Oce. W.					
<i>Divisions</i> , 5.— <i>Archbishop</i> , 1.— <i>Bishops</i> , 5.— <i>No Universities or Orders.</i>					
<i>Divisions.</i>					
1. Lapland,	} N.	{	<i>Ch. Towns.</i>		
2. Iceland Isle,			LAND and WATER CONNE CTIONS.		
3. Drontheim,	} Mid.	{	<i>Seas</i> , 3.—Frozen Ocean, N. Scagge-		
4. Bergen,			rac, S. W. German, W.		
5. Anflo, S.			<i>Bays</i> , 2.—Anflo, S. W. Tane, N.		
			<i>Sounds</i> , 2.—Pape, Steer, W.		
			<i>Capes</i> , 2.—North, N. The Naze, S. W.		
			<i>Isles</i> , 1.—Ferro, N. W.		
			<i>Mountains</i> , 2.—Dofrine, E. Hardanger, N		
			<i>Rivers and Lakes</i> .—See Sweden.		
			<i>Arbp. Drontheim</i> .— <i>Bps.</i> 5. Bergen,		
			Anflo, Staffanger, Scalholt, Holsa.		

Title.—See Denmark.
Chief Town, Bergen.—*Climate*, XI.
Dist. fr. London, 540, Miles, N.

RUSSIA, Empire, N. E. of Rome.

Lat.	Long.	Length.	Breadth.	Sq. Miles.	Inhabitants.
47° to 72 N.	23° to 65 E.	1,500 m.	1,100 m.	1,103,485.	20,000,000.
<i>Boundary</i> .—Frozen Ocean, N. Tartary, S. Siberia, E. Poland, W.					
<i>Divisions</i> , 7.— <i>Metropolitans</i> , 5.— <i>Arbbs.</i> 14.— <i>Bps.</i> 5.— <i>Univ.</i> 2.— <i>Orders</i> , 3.					
<i>Provinces.</i>					
1. Lapland,	N.	Kola.	<i>Ch. Towns.</i>		
2. Moscow,	} Mid.	{	LAND and WATER CONNE CTIONS.		
3. Belgorod,			<i>Seas</i> , 3.—Frozen Ocean, White, N. W.		
4. Ukrain,	S.	Kiof.	Asoph, W.		
5. Ingria,	} W.	{	<i>Gulphs</i> , 2.—Finland, N. W. Riga, W.		
6. Finland,			<i>Streights</i> , 1.—Wygate, N.		
7. Livonia,	S.	Riga.	<i>Capes</i> , 1.—Candenois, N.		
			<i>Lakes</i> , 6.—Lodoga, Onega, Ilmen,		
			White, Worfero, Pepus.		
			<i>Mountains</i> , 2.—Riphean, N. Bog-		
			lowy, S.		
			<i>Rivers</i> , 7. <i>Rise. Course. Fall.</i>		
			Tobol, }		
			Irtis, }		
			Oby, }		
			Wolga, Belozaro, }		
			Den, Rezan, }		
			Dwina, Wolog, N. White Sea.		
			Nieper, See Poland.		
			<i>V. Metropolitans</i> .—1. Kiowskoi and		
			Halitskoi. 2. Mokowskoi and Po-		
			donskoi. 3. Razanskoy and Moo-		
			romskoy. 4. Tolomskoy and Ir-		
			kut.		

Title.—Emperors of all the Russias;
 Sovereign Princeps of Muscovy,
 Kiovia, Wolodimir, and Novogorod;
 Czarina, or Queen of Siberia,
 Cazan, and Astracan; Great Dukes
 of Smolensko; Dukes of Estonia,
 Letonia, Carelia, Ingermannia,
 and Kexholm; Chief and Protectors
 of the Greek Church.
Eldest Son.—Grand Duke of Russia.
Chief Town, Petersburg.—*Climate*, XI.
Inhabitants of Petersb. 130,000.
Distance from London, 1,140
 Miles N. E. —Coronation Place,
 Moscow.

kutskoy. 5. Rostowkoy and Jaroslavskoy.

XIV. *Arbys*.—1. Novogorodski and Welikolutsky. 2. Vologodski and Belozerski. 3. Nisicorordski and Jalotorki. 4. Ranfanskoy and Ivejasky. 5. Kolomenski and Karfirski. 6. Peskosky and Narusky. 7. Viatki and Vilicoperinski. 8. Archani-keloroodfki and Kolimorofki. 9. Worrowteskoi and Tavarowski. 10.

Chernikowski and Novogorodski. 11. Belogordski and Objenski. 12. Ustuski and Kaskinski. 13. Peterburaskoi and Slutenburaskoi. 14. Suldaskoi and Kasemirskoi.

Bishops, 7. Astrankaskoi, Smolenskoi, Perejussowskoi, Terskoi, Smolenskoi, Ladowskoi, Jacutskoi.

Universities, 2.—Moscow, Petersburg.
Orders, 3.—St. Andrew, St. Alexander,
St. Catharine.

Isles in Turkey, 24. *omitted*.—Candia, Caphalonion, Cerigo, Cyclades, Cyprus, Compare, Corfu, Lemnos, Lesbos, Leucas, Livinia, Negropont, Paros, Patmos, Rhodes, Samos, Santa Mura, Santorin, Sapienza, Scio, Seyros, Stivali, Tenedos, Zante.

I N E U R O P E.


III. *Empires*, { Germany,
Muscovy,
Turkey.
Great Britain,
France,
Spain,
Portugal,
X. *Kingdoms*, { Poland,
Prussia,
Denmark,
Sweden,
Sardinia,
Two Sicilies.

		<i>Chief Commod.</i>
	<i>Duchies</i>	Iron, Tin, Coals,
	{ Austria,	Alum, Amber,
	{ Tuscany,	Marble, Masts,
	{ Courland.	
	{ Venice,	Wine, Beer, Clocks,
	{ Holland,	Lace, Silk, Wool,
	{ Switzerland,	Pitch, Tar, &c.
	{ Genoa,	Greatest Curiosity,
	{ Geneva,	Whale Fishery on
	{ Lucca,	the Coast of <i>Green-</i>
	{ St. Marino,	land, among Fields
	{ Ragusa,	of Ice.
VIII. <i>Republicks.</i>		
	N. B. A <i>Whale</i> 60 or 80 Feet long is	
	worth 1000 <i>l.</i>	

Thus the *Geographical Skeleton of Europe* is finished; and the *Geographical Skeletons of Asia, Africa, and America*, in our next *Palladium* for 1779, will be finished in the same *methodical Manner*; after which we shall proceed to cloath these *Skeletons* with their proper Coverings (of internal and external *Anatomy*), so as to form four intelligent, distinct, and *Instructive Beings*; giving a *methodical Account* of the Whole *terraqueous Globe*, as concisely as possible, for the *Utility* of the present Age, and future Generations.

A D V E R T I S E M E N T.

•• Correspondents and Palladium Members are desired to send their Orders, and Money with them, for Palladiums they send for at Booksellers Price, to Mr. Bew's, Bookfeller, in Pater-noster-Row, London, where they may have a Receipt for the Payment thereof, and their Palladiums will be duly conveyed to them by that Publisher, and Proprietor of the Palladium Copy. The Expence of a single Palladium, for the present is raised to 15. 6d. to defray the excessive Expence of printing the difficult Subjects.

 All Correspondents are likewise desired to send all their Letters (Franked or Post Paid) to Mr. B. Cole's, next the Globe, Fleet-Street, directed for the Palladium Author, or his Secretary; where they may be furnished with all Kinds of Mathematical Instruments, and with new and correct Sea Instruments, and a Ready Reckoner of a Ship's Way, sold at reasonable Prices.—No Letters or Packet will be received but such as come Free or Post Paid.

P A R T II.

ANSWERS to the ÆNIGMAS in last Year's PALLADIUM.

I. The HUMAN HEAD.	IV. CURTAINS.	VI. A WAFER or SEAL.
II. A ROAD GUIDE.	V. An EXTIN-	Prize. A STOCKING-
III. A GOOSE QUILL.	GUISHER.	LOOM.

A GENERAL ANSWER to the ÆNIGMAS in last Year's PALLADIUM,
by Mr. Isaac Gumley of Countesthorpe, near Leicester.

THE LOVERS SOLILOQUY.

THE spacious Fields in gaudy Robes were drest,
And all the Swains the Pow'r of Love confest;
Soft flow'd the silver Streams adown the Dale,
And balmy Spices loaded every Gale;
When *Damon* all dejected and forlorn,
Thus mourn'd his Fate behind a spreading Thorn.

O *Love*, thou Tyrant, while of thee possést,
What Pains I feel! what Daggers pierce my Breast!
By Day no lucid Interval I find,

No pleasing Scenes to recreate my Mind;
And when old Night her sable *Curtain* spreads, 4.

And weary Mortals press their downy Beds,
I tofs about, and count the tedious Hours,
And Sleep suspends her renovating Pow'rs.

What boots it me, that Flowers adorn the Spring,
And all the Groves with rural Music ring?

For, in my Mind, no Satisfaction's found;
I still am sad tho' Nature smiles around.

With useful Grain tho' Summer fills the Field,
And Autumn all her countless Treasures yield,

Tho' Winter comes array'd in frosty Gems,
With rattling Hail and swift redundant Streams,

Yet I, alas! no Alteration find,

I still am sad, and Love torments my Mind:

For dear *Myrtille's* Heart I ne'er can move,

With all the tender Agonies of Love;

Her Parents o'er her such Dominion hold,

That none must win without the Aid of Gold.

O could I tell her how my Bosom glows!

And paint in Language, apt, my pow'ful Woes!

Could she but know the Sorrows I sustain,

She'd surely pity and remove my Pain.

But could I equal *Homer's* deathless Song,

Or had I *Tully's* energetic Tongue,

Yet should I fail to paint my deep Distress,

Which none but they that love like me can guess.—

Within my breast what strong Emotions rise,

Whene'er I view those dear deluding Eyes,

That heavenly Mien, which ev'ry Swain alarms,

Those blooming Cheeks, and all those Heav'nly Charms!

E

The

The Voice of Love I instantly obey,
 And quite transported gaze my Soul away!
 But when I view her Charms with fond Delight,
 Grief lifts her *Head*, and spoils the blissful Sight, 1!
 Sweet smiling Hope before the Monster flies,
 And fell Despair and all her Fiends arise.
 Thus when the Child some tempting Fruit surveys,
 Elate with Joy how fondly does it gaze!
 But should the Fates it's ardent Wish controul,
 All Joy subsides, and Sorrow fills the Soul.

Begone, thou Fiend, O Mammon, fly from hence,
 And plague no more the Friends of Love and Sense;
 May thy infernal Usurpations cease,
 And all the Nymphs and Swains unite in Peace.
 How many Victims do we daily see,
 Which fordid Parents sacrifice to Thee;
 The soft Complaint, the bosom-heaving Sigh,
 The melting Tear, and tender-pleading Eye,
 Can ne'er prevail, for thou hast Pow'r alone,
 T' *Extinguish* Sense; and turn the Heart to Stone. 5.

O lov'd *Myrtilla*! hear your faithful Swain,
 And with a Smile exterminate my Pain;
 To heal my Wounds let soft Compassion flow,
 O cheer my Heart and banish all my Woe.
 But why should I such Supplications *Frame*? Prize.
 Parental Maxims disappoint their Aim,
 By Gold alone *Myrtilla* must be won;
 Well may I grieve, for I, alas, have none.

O Shepherds, now suspend your jocund Strains,
 Let Notes of Woe be heard thro' all the Plains,
 My Grief proclaim to all the Rocks around,
 Let every Grove reverberate the Sound.
 Ye youthful Nymphs, so charming and so free,
 Decline your Mirth, and sympathize with me;
 By mercenary Motives ne'er be sway'd,
 Hear Nature speak, and let her be obey'd;
 She'll bid you take the Man you like the best,
 Be rich or poor, and leave to Heav'n the rest.

Here, far from home, 'mongst lonely Wilds I stray,
 Without one friendly *Hand* to point my Way, 2.
 Sublimier Objects now no Joys impart,
 Sighs follow Sighs, and Grief devours my Heart:
 But soon will all the turbid Scenes be o'er,
 And Love will vex my faithful Heart no more;
 Death soon will come to *Seal* my wakeful Eyes, 6.
 Stop ev'ry Pang, and waft me to the Skies:
 There smiling Angels welcome Pilgrims Home,
 And Hallelujahs shake the ample Dome;
 Then every Heart is fill'd with sacred Joy,
 And Songs of Love the blissful Choirs employ!

Answer

Answer
 In *Br*
 For *M*
 The *S*
 And *L*

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Mr. H
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John
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Mr. J
 of *L*
Mr. J
 all *in*
 most

Answer to the PRIZE-ÆNIGMA by Agricola of Cambridge.

As flies the Shuttle thro' the Loom †, † Prize, Stocking-Loom.
And cuts the liquid Air;
Just so his Passage to the Tomb,
Frail Man may well compare;
For as the Shuttle lays the Thread,
By passing thro' the Frame;
So will good Deeds, when Man is dead,
Long Time exalt his Name.

Answer to the PRIZE-ÆNIGMA by Mr. Smith, of Lamberhurst, Kent.

In Britain's Isle, renown'd for Arms and Arts,
For Men of Genius and exalted Parts,
The Stocking-Loom records the Inventor's Name,
And Lee * stands foremost in the Lists of Fame.
* A Clergyman,
once of Cambridge,
the Inventor.

Answer to the PRIZE-ÆNIGMA, by Junior.

A Stocking-Loom is found to be the Prize,
Seen thro' the Author's well-contriv'd Disguise;
Much Praise is due to him who paints the Loom,
But more to the Inventor †—I presume.
† The Rev. Mr.
Lee.

A general Answer to the ÆNIGMAS by Mr. Stuchfield of Stepney.

When fable Night her Curtain drew, 4.
With Apparitions all in View!
The Pens, Ink, Wax and Wafer, 3, 6.
The Task I had myself assign'd,
Was four Ænigmas then to find,
I often snuff'd the Taper.
At last they appeared to my View, without Doubt, § Alluding to
I then went to bed, and the Candle put out §. the Extinguisher.

PRIZE-ÆNIGMA answered by Miss Polly Stow.

The Countess's Bard for his Brilliant Lays,
Should by the Bright Ladies be crowned with the Bays!

Mr. R. Dutton, in Verse, answered most of the Ænigmas; Mr. Jn. Parker of Ashby de la Zouch, all the Ænigmas, and also the Prize Ænigma, in Verse; as did Mr. Stephen Hartley of Sowerby Bridge; Mr. Wm. Swift of Stow; Mr. Wm. Walker of Paisbush, Durham; and Amelia Stanhope; the Prize in Verse, answered also by a Son of Mars; the Rev. Tho. Vaughan, Morpeth, Northumberland; Mr. Richard Batho answered the Ænigmas in Prose; Mr. Tho. Wood of Stoke Golding, Lincolnshire, answered them in Verse; Mr. John James answered all the Ænigmas in One Couplet, and the Prize in another; Mr. Wm. Spalton of Rainshaw, all the Ænigmas but 6, in Verse; Mr. John Cotton, Huntingdon, answered the Prize in Verse; Mr. Th. Smith of Lamberhurst, all in Verse; all in Prose were answered by Junior; and Mr. John Needham, Hinchley, all; Mr. Matthew Habbershon of Sheffield, all in elegant Verse, we have not Room for; Mr. George France answered most of the Ænigmas.

ANSWERS to the QUERIES in last Year's PALLADIUM.

I. QUERE 252, answered by Mr. W. Turner, Teacher of the Classics and Mathematics, at Witney, Oxfordshire.

Philosophers are by no Means agreed as to the Cause of Freezing, or the Mode of it's Operation. The *Cartesians* account for it by the Reccess, or going out of the *atherial* Matter from the Pores of the Water. The *Corpuscularians*, on the other Hand, attribute Freezing to the Ingress of *frigorific* * Particles, as they call them. * *Darkness*.

Hobbes asserts, that these Particles are Nothing else but common Air, which entangling itself with the Particles of Water, prevent their Motion.

Others will have a Kind of *nitrous* Salt to be the Cause of Congelation, by insinuating itself between the Particles of Water, and fixing them together like Nails: and indeed it seems probable that Cold and Freezing do arise from some Substance of a saline Nature floating in the Air; since all Salts, and particularly nitrous ones, when mixed with Ice and Snow, greatly increase their Cold, and even Bulk.

Mr. J. Hunt, who writes an elegant Hand, and supposed to preside at some School or Academy, has answered the above Quere, exactly in the same Words with Mr. W. Turner. Several of our Correspondents attribute the Operation of Freezing to the Interposition of *nitrous* Salts; but the best Account that we have read, or seen communicated by others is, that our Ideas are far short of conceiving the Manner how this wonderful Effect, in Nature, is adequately produced. As the judicious *Locke* has remarked that we have no perfecter Ideas of bodily than intellectual Substance, but from what we acquire from what we experience of either; that we can know no more of Matter, its Modifications and the Effects of Body upon Body, but what we discover on Trial, any more than we can have of the Operations of our Minds, our Thoughts, our Will, and Resolutions, how they are agitated and determined, but from what we feel and experience: so that these Sort of Queries serve to moderate and stop our Enquiries at proper Limits, and exalt our Admiration of the divine Contriver and Maker of all Things!

II. QUERE 253, Answered by Mr. W. Turner of Witney.

Numa Pompilius, the Successor of *Romulus*, first changed the Order of the Months; making *January* the First Month, in Honour of *Janus*.

N. B. Mr. *Joseph James* thinks, that the Custom of dating the Year from the 25th of *March* arose from the Birth of the *Virgin Mary* happening on that Day; who being the Mother of *Christ*, it was made a memorable Day for Commencement of the Year. The Custom of dating the Year from the First of *January*, did not take Place, in *England*, till the Alteration of the Stile, in the Year 1752, to which Time the preceding and new Year were dated, fractionwise, together, from 1st *January* to the 25th of *March* following.

III. QUERE 254, answered by Mr. Turner of Witney.

The First Europeans who discovered the Cape of Good Hope, were the Portuguese in the Year 1498, in King *Amanuel's* Reign.

Mr. *Alex. Rowe* observes, from p. 843, *Heylin's Cosmography*, that the Cape of Good Hope was discovered by *Bartholomew Diez*, a Portuguese. And that Cape Horn was discovered in the year 1518 or 19, by *Francis Magellan*, a Portuguese.

IV. QUERE

IV. QUERE 255, answered by Geographical.

The greatest Depth of the Sea is conjectured to be about the Height of the highest Mountain, by *Analogy* of reasoning, with respect to the different Heights of Land and Depths of the Ocean, considered as gradually ascending and descending from the Shores, to the Heights of Land and Depths of Sea.

The best Method for determining the Length of Rivers, without tracing them to their Fountain Heads by Land, is by measuring their Dimensions laid down on the best Maps.

The other *Method* is, by taking the Breadth of Rivers in several equally distant Places, in order to determine the mean Breadth and Decrease of Breadth at certain Distances; and thence to determine the *angular Distance* where those decreasing Breadths terminate.

V. QUERE 256, answered by Mr. W. Turner of Witney.

Snow is generally allowed to be a *Meteor*, formed in the middle Region of the Air, from Vapours raised by the Action of the Sun, there congealed, it's Gravity thereby increased, and returned to the Earth in little white *Willi* or Flakes.

Hail is generally allowed to be formed from Drops of Rain, frozen in their Passage thro' the middle Region of the Air.

Mr. *Joseph James* answered this *Quere* much to the same Purpose; as do several of our other ingenious Correspondents.

But, in all these Disquisitions and Explanations, the Jargon of Terms, without any adequate Conceptions annexed to them, Ideas are confounded, and we are left in Darkness, Doubt, and Uncertainty, as our Notions are with respect to the Operation of *Freezing*, in the First *Quere*. They can therefore only serve to demonstrate our Ignorance of the Ways and Modes of Creation; except so far as what the infinite Creator has accommodated our Senses to comprehend, as only necessary to be discovered to us, for his Glory and our Admiration!

VII. QUERE 257, answered by Mr. W. Turner of Witney.

It was the Opinion of Sir *Isaac Newton*, that the *Sun* and fixed *Stars*, are great Earths vehemently hot; whose *Heat* is conserved by the Greatness of their Bodies, and their *mutual* Action and Re-action between them, and the Light which they emit; and whose Parts are kept from fuming away, not only by their *Fixity*, but also by the vast Weight and Density of the Atmospheres incumbent on them, and every Way strongly compressing them, and condensing the Vapours and Exhalations which arise from them. The *Light* seems to be emitted from the *Sun* (with incredible Velocity) much after the Manner, as from Iron when heated to such a Degree, as to be just going into *Fusion*, by the vibrating Motion of its Parts, when it emits with Force and Violence, copious Streams of liquid Fire all round.

Remark.—This great Observer of Nature, Sir *Isaac Newton*, was not only capable of penetrating further than any Man who lived before him, or since, and to make the best Use of his Observations, but had adequate Talents to describe what he observed, in the most clear and intelligent Manner.

PALLADIUM AUTHOR.

VII. QUERE 258, answered by Mr. W. Turner of Witney.

M. Mariot accounts for *Parhelia*, or multiplied mock Suns, from an Infinity of little Particles of Ice floating in the Air, that multiply the Image of the Sun by *Refraction* and *Reflection*.

VIII. QUERE

VIII. QUERE 259, answered by Mr. W. Turner.

Antonius de Dominis first accounted for the *Rainbow* in 1611, by Refraction and Reflection of the Sun Beams in spherical Drops of Water; which he confirmed by Experiments made with Glafs Globes, full of Water; wherein he was followed by *Des Cartes*; who improved upon his Account: But the *Newtonian* Doctrine of Colours supplies and corrects their Explanations; the Theory of which being too long for the prescribed Limits of the *Palladium* I omit, but refer to

Remark. The *Rainbow* is always situated in the opposite Part of the Heavens to the Sun, whose Rays by Refraction and Reflection, through the spherical Drops of Water, collected against him, in a visionary Cloud, form that delightful, striking, and variegated Bow, seen in the opposite Part of the Heavens to the Sun; and what may be represented, by a philosophical Experiment, in a Room.

Several of our Correspondents sent us a similar Account and Explanation of this curious Phenomenon.

IX. QUERE 260, answered by Mr. Turner.

The late ingenious Mr. *Robins* concludes, from Experiments related in his new *Principles of Gunnery*, that the Force of fired Gun-powder, at the Instant of its Explosion, is the same with that of an elastic Fluid of a thousand Times the Density of common Air; and that the Elasticity of this Fluid, like that of Air, is proportional to its Density.

Mr. *Geo. France* answered 2, 6, 7, 8, and 9 *Queries*, in a similar Manner to the foregoing Answers; who says, that the Subjects of the 7th and 8th *Queries* are copiously handled in *Mandey's Synopsis Mathematicæ*.

X. QUERE 261, answered by Mr. W. Turner.

It is not only my opinion, but also the opinion of a very eminent *Peruke-maker* and Politician (whom I have consulted) that B has lost the Wager. It is this sagacious Adept's Opinion also, that C falls under the same Predicament, and has lost his Wager:

For 6 Dozen, Dozen - = $72 \times 12 = 864$ } Wagered by D against
6, Dozen Dozen - = $6 \times 144 = 864$ } C.

Also Half a Dozen, Dozen = $6 \times 12 = 72$ } Wagered by C against
And Half, a Dozen Dozen = $\frac{1}{2} \times 144 = 72$ } D.

So that C has lost his Wager at any ————

Rate by ———— - - 792 Q. E. D.

Mr. *Stuchfield* of *Stepney* has proved the same great Truth to a mathematical Demonstration.

N. B. One of the Contenders about this Wager objects to his Opponent, that Smearing is not Oiling.

Remark. Since the Decision of the above Wager by the Powers of Arithmetic, the Fashion of proving Truth by laying Wagers still prevailing, a Wager is laid between a Sailor and a Waterman, how many Points of the Compass are between South-by-West and South-by-East. The Waterman insists that there is only One Point, and the Seaman affirms there are Two Points (yet both are right in respect of nominal and Degree Points) the latter affirming, that caning an Adversary with a Stick is greater Propriety than sticking him with a Cane.

PRIZE-QUERE answered by Mr. W. Turner of Witney, Oxfordshire, addressed to Miss Stow.

IN the Year of Three thousand Eight hundred and One,	3801
The same will be Prime, Epoch, Cycle of Sun †;	† each 2
In Eight thousand Five hundred and Ninety-seven, then	† 8597
Those Three famous Cycles will each † be just Ten.	

And

And now, pray Miss Polly, accept of my Parts,
And work me some Ruffles mark'd with *Lovers Hearts*.

General Table and Answer to the PRIZE-QUEERE, by Mr. R. Parael.

In the Year.	Epaët, Sun's Cyc. Gold. No.	In the Year.	Epaët, Sun's Cyc. Gold. No.	In the Year.	Epaët, Sun's Cyc. Gold. No.
3801	2	6462	3	8588	1
3804	5	6465	6	8591	4
3807	8	6468	9	8594	7
3810	11	6471	12	8597	10
3813	14	6474	15	8600	13
3816	17	6477	18	8603	16
				8606	19

N. B. The foregoing were the only true *Solutions* we have received to the PRIZE-QUEERE.

ANSWERS to the REBUSES in last Year's PALLADIUM.

I. MAYBRIDGE. | III. EWEL. | V. A NIGHTINGALE.
II. HOLIDAY. | IV. A VIRGIN. | VI. COUNTSTHORPE.

A general Answer to the Rebuses by Mr. John Parker of Ashby de la Zouch.

Miss Maybridge fraught with ev'ry Grace, 1
That captivates the human Race ;
No idle Time she spends at Plays,
Devoutly keeps the *Holidays* ; 2
To *Ewel* she ne'er wants to roam, 3
She finds substantial Joys at home ;
In kindly aiding the distress'd,
And making all about her blest'd !
Virgins of *Countesthorpe* adieu ! 4, 6
Her bright Example you'll pursue ;
Nor let the Syren-Vice prevail,
Tho' soothing as the *Nightingale*. 5

Mr. Alex. Rowe answers thus.

Miss Maybridge, Holiday, and *Ewel*, 1, 2, 3
Are Three bright Lassies, but not cruel ;
And *Philomel's* delightful Strains, 5
At *Countesthorpe* the Ear detains. 6

Mr. Stuchfield answers thus.

Each Grace that is lovely Miss Maybridge displays, 5
Whose Song far exceeds the sweet *Nightingale's* Lays. 6

Mr. Wm. Turner of Witney, Oxfordshire, thus.

My Love in May the Bridge pass'd o'er, 1
The *Virgin* look'd so fair, 4
Not *Countesthorpe*, nor *Ewel* Choir, 6, 3
Produc'd an Equal there.
No *Nightingale* e'er warbl'd so, 5
With soft melodious Air,
Nor *Holy Thursday's* Revel show, 2
Was half so dainty Cheer !

Mr.

Mr. R. Parnel answered thus. Addressed to Mr. Stuchfield.

As in lovely *Maybridge* all the Graces combine, 1
 Let *Hymen*, next *Holiday*, you and her join, 2
 Left the *Countesthorpe* Poet on her call an Eye, 6
 Who is such a Man—that no Nymph can deny.

Mr. Richard Batho of *Tilstock*, near *Whitchurch*, *Shropshire*, answered the Rebus in Versification; *Mr. W. Spalton*, all the Rebus in Prose; *Mr. Swift*, all in Verse; *Mr. Jos. James* of *Stoke Bishop*, near *Bristol*, answered all; *Mr. John Needham* of *Hinchley*, *Leicestershire*, all in Prose, also the Prize; *Mr. Robinson* of *Biddick*, all; the *Rev'd Thomas Vaughan* answered all in Verse; *Junier* (not *Junius*) of *Lamberhurst*, *Kent*, answered all in Rhime; *Mr. Matthew Habbershon* of *Sheffield*, all in Prose; *Mr. Thomas Wood* answered 1, 2, 4; *Mr. Stephen Hartley*, most of the Rebus.

ANSWERS to the PARADOXES in last Year's PALLADIUM.

I. PARADOX answered by *Mr. Alex. Rowe* of *Reginnis*, *Cornwall*.

A *Eat* Two Species does partake,
 Both *Bird* and *Quadruped* in Make.

By Mr. Swift.

A *Bat* is a *Bird* of amphibious Nature,
 That suckles her Young, but never drinks Water.

Mr. W. Fenn, *Mr. Needham*, *Mr. R. Dutton*, and others, give Answers by a Woman's Name *Bird* giving Suck to her own Species.

Mr. Richard Batho answered it, as did *Mr. John Parker*.

II. PARADOX answered by *Mr. R. Dutton* of *Kingsly*, *Cheshire*.

The Section of a Cylinder, cut obliquely through the Axis, will be the Oval required.

Mr. Alex. Rowe also observes, that if an hollow Cylinder be cut through obliquely to the Axis, that the Plane of the Section will be an *Ellipsis*; and consequently, that a round Stopper will completely fill up the oval and round Space of that Cavity, by pushing the Stopper farther into the Space.

Junier of *Lamberhurst*, *Kent*, says, that a round Hole being drilled thro' a Cylinder, the Surface of that Hole will evidently be an oval Space, and the drilled Hole a circular one, that consequently a circular Stopper will fill both Spaces.

Mr. Richard Batho answered it in the same Manner.

III. PARADOX answered by *Mr. Alexander Rowe*.

Let the Weight of a Pound of One Commodity be to that of another, as 1 to 1 $\frac{43}{200}$ (there being that Difference between 1 *£. Troy* and 1 *£. Avoirdupois* Weight) then 1215 Pounds of the less, or *Troy* Weight, being put in One Scale, will exactly balance 1000 Pounds of the greater Weight, or *Avoirdupois*, put in the other; both Scales, without any Weight in them, having a just Balance, the Arms of the Beam equally distant from the Fulcrum or Hinge, on which the Weight is poised and turns.

Mr. Stephen Hartley of *Sowerby Bridge*, answers it in the same judicious Manner, thus: By Experiment, that a Pound *Avoirdupois* is to a Pound *Troy*, as 1.215 to 1. Therefore, $\frac{1215}{1.215} = 1000$ Pounds *Avoirdupois*; which

which being put into One Scale, and 1215 Pounds Troy, put into another, will make an *exact* Balance.

IV. PARADOX answered by Mr. Alexander Rowe.

When *Well* and *Tides* united are, † Within 8 Miles of
Then *Tideswell-Town* † will plain appear. *Derbyshire Peak.*

Mr. *Stuchfield* of *Stepney* gave the same Answer; as did Mr. *Stephen Hartley*, Mr. *John Parker*, and others.

V. PARADOX answered by Mr. Alexander Rowe.

FIRST, $2.51^2 \times .7854 \times 3 = 14.72625$ cubic Inches = Cup's Solidity. Now, by *Ward's Tables* of Specific Gravity, a cubic Inch of red Wine weighs .523766 oz. Troy. Therefore, $14.72625 \times 0.523766 = 7.713109$ oz. = the Wine's Weight in the Cup below Stairs. Hence, reciprocally, 21000000^2 (Earth's mean Radius): 7.713109 oz. :: 21000000^2 : 7.71310312 oz. = Weight above Stairs. Whence $7.713109 - 7.71310312$, &c. = 0.0000587 = 0 oz. 0 dwts. $\frac{1}{354}$ = Weight of the Wine contained in the Cup below more than that above Stairs: A wonderful Difference!

Remark. This Answer about the Difference of Weight of Wine held in the same Cup below and above Stairs, is a true Determination; but it is not the required Difference of Capacity of the same Cup below and above Stairs, whose Solidity is computed = 14.72625 cubic Inches, without taking in the different Convexities of the Surfaces of the Liquor below and above Stairs, according to the different Radii drawn to the Liquor's Surface from the Earth's Center, causing a real, though exceeding small Difference (like the exceeding small Difference of the Pendulum, attracted $5''.8$ from the perpendicular Direction) when removed to a higher Part of Mountain *Schehallian*, in the remote Part of Scotland.

Mr. *Stephen Hartley*, by considering this Paradox like Mr. *Rowe*, finds the Solidity of the Cup = 14.72625 cubic Inches as he did; and since a Body (he says) placed above the Earth's Surface is in the reciprocal duplicate Ratio of that Distance from the Earth's Center, he finds the Difference .00003 of a solid Inch, in respect of Weight, less above than below Stairs, differing from Mr. *Rowe's* Difference .0000587 of a solid Inch less.

Remark. The globular Surface of the Liquor, at the Top of the Cup, will be less convex or flatter above Stairs than below; because the Radius to the Liquor's globular Surface, above Stairs, from the Earth's Center, is greater than the Radius to the Liquor's Surface below; the outward Circle being greater, and nearer to a right Line. Therefore, the Cup holds less above than below, by the Difference of the globular Segments from the Breadth of the Cup at Top, calculated to the different Radii from the Earth's Center to where the Cup is placed, still to be computed, further from or nearer to the Earth's Center; being something similar to the minute Difference between the Earth's combined with a Mountain-Attraction, and the Attraction at the Earth's Surface below the Mountain.—PAL. AUTHOR.

ANSWERS to the QUESTIONS in last Year's PALLADIUM.

I. QUESTION 585, answered by Mr. James Lamb of Sproatley, near Hull.

By the *Practical Arithmetician*, p. 379, we have $\text{Log. } 400 - \text{Log. } 60 + \frac{70}{1.05} + \frac{80}{1.05^2} + \frac{90}{1.05^3} + \frac{100}{1.05^4} \div \text{Log. } 1.05 = 2.2025126$ Years = 2

F

Years,

Years, 2 Months, 2 Weeks, 3 Days, allowing 365 Days to a Year, the correct equated Time required.

Mr. Isaac Rowbottom of Westballam puts $r = 1.05$, then the Amount of all the Payments, as they became due, to the Time of the last Payment $= 60r^4 + 70r^3 + 80r^2 + 90r + 100 = 436.664125 \text{ £} = a$. With this Amount, and the Sum of the several Payments $= 400 \text{ £} = p$, as a Principal, find $x =$ Time sought. Hence, by the common Rules of Compound

Interest, we have $pr^{4-x} = a$. Therefore, $4 - \frac{a}{p} = 2.2025126 \text{ Yrs.}$

as above.

$\frac{r}{p}$ W.W.R.

Mr. Geo. Gedney of Sproatley proceeds in a Manner like Mr. Lamb's Method of Solution. He finds the Sum of Mr. Lamb's Series of 5 Terms $= 359.24462 \text{ £} =$ the present Worth of the whole Number of Payments.

Then he determines the equated Time $= \frac{\text{£} 400 - \text{£} 359.24462 \text{ L.}}{\text{£} 1.05} = 2.$

202517 $=$ 2 Years, 2 Months, 2 Weeks, 3 Days, as above. W.W.R.

Mr. Peck, School-master at Singletborne, near Beverley, answers this Question by the very same Method. Mr. Penn of Chalfont, by a like Method, di-

ligently finds the equated Time $= 2 \frac{81}{400} \text{ Years} = 2.2025 \text{ Years}$, being very

near the above Number.

Mr. Cartill of Walkington, near Beverley, Yorkshire, by a correct Theorem, sends for Answer, 2.202546 Years, equated Time of Payment. Mr. R. Witter of Clotten, Cheshire, answered it; as did Mr. J. Mouldale, Clerk to Mr. Banner, Old Street, London [late of Mandley, Cheshire] by a Theorem analytically deduced. Mr. Wm. Veck, Land Surveyor of Cosham, near Portsmouth, accurately solved it.

Other Correspondents attempted to give Solutions, but all failed of Truth but the above. Some were distanced, or thrown out of the Course.

II. QUESTION 586, answered by Mr. James Lamb, near Hull.

Put $x =$ current Year of Christ sought? Then, by the Royal Astronomer

and Navigator, p. 172, $\frac{x+9-22}{28}$, $\frac{x+1-11}{19}$, and $\frac{x+3-10}{15}$,

$\frac{x-13}{28}$, $\frac{x-10}{19}$, $\frac{x-7}{15}$ will be the true Conditions of the Question,

which must be all whole Numbers. Put $\frac{x-13}{28} = a$, then $x = 28a + 13$;

this put in 2d Condition, then $\frac{28a+3}{19} =$ whole Number. Abridged,

$\frac{9a+3}{19} =$ whole Number; which multiplied by 2, and subtracted from

$\frac{19a}{19}$ we have $\frac{a-6}{19} =$ whole Num. $= b$; here $a = 19b + 6 =$

$\frac{x-13}{28}$ above. Whence $x = 532b + 131$. Put this Value for x in the

last Condition, and $\frac{532b+174}{15} =$ whole Number; which abridged, mul-

tiplied

multiplied by 2, and subtracted from $\frac{15b}{15}$, a whole Number, we get $\frac{b-3}{15}$ = whole Numb. = c , where $b = 15c + 3$. Put this Value of b , in the last found Value of x , and then $x = 7980c + 1777$, a general Rule.

To find the least Year of Christ, when these Three Circumstances happen?

Let $c = 0$, then the least Value of x will be 1777, the current Year of Christ.

By Royal Astron. p. 161, to 1777 add 4713, the Number of the Julian Period the Year before Christ, the Sum 6490 is the Year of the Julian Period required.

Remark. The above Solution is performed in a masterly and correct Manner, fit for a Pattern-Solution.

Mr. Alex. Rowe finds the Julian Period, by a general Rule, = 6490, from which subtracting 4713, the Julian Period the Year before Christ there remains 1777 = the Year of Christ current, required.

Mr. Isaac Rowbottom of Westballam answers it correctly, according to Mr. Lamb's Method of Solution above; also Mr. Jos. James, Mr. Thos. Robinson, Mr. John Gedney of Sproatley, Yorkshire, Mr. John Cartill of Walkington, near Beverley, Yorkshire, by a general Deduction and Theorem, gives the Answer as above.

Mr. John Fletcher of Nantwich observes, that a Solution is given to this Question in Emerson's Algebra, Ex. 5, p. 244.

Mr. John Buckley, Assistant to Mr. Riley, in the Grammar School of Coln, Lancashire, observes, that in p. 380 of Keil's Astronomy, there is this general Rule. Multiply the Numbers 4845, 4200, 6916, by the Numbers of the Cycles of the Sun, Moon, and Roman Indiction respectively, and divide the Sum of these Products by 7980 (neglecting the Quotient) and the Remainder will be the Year of the Julian Period when the Numbers of those Cycles happen. This Rule is also in the Royal Astronomer, p. 160. Mr. B. Witter of Clotton, Cheshire, answered it, as did Mr. Joseph Mouldale, Old-street, London, and Mr. W. Veck of Cosham, near Portsmouth.

III. QUESTION 587, answered by Mr. Joseph James of Stoke Bishop, near Bristol.

The Probability of 6 Heads turning up at One Cast with 10 Guineas, is exactly the same as that of 6 Heads turning up at 10 Casts with One Guinea.

Put m = Num. of Chances of One Head turning up at One Trial, p = those of failing at One Trial (which in this Case are both equal to 1) $t = 6$ = Number of Heads to be turned up, and $n = 10$ the Number of Guineas, or Trials with One Guinea. Then, the Probability of casting One Head at the

First Trial is $\frac{m}{m+p}$, and that of its happening t Times successively,

$\frac{m^t}{m+p|}$ t : the Probability of its failing in $n - t$ Times, or Trials, is

$\frac{p^{n-t}}{m+p|}$; consequently $\frac{m^t}{m+p|} \times \frac{p^{n-t}}{m+p|} =$ the Probability of the 6

Heads turning up in the First 6 Trials, and of failing in the remaining 4 Trials.

Now, since the Probability of the happening of the 6 Events, at One Trial, with 10 Guineas, may be considered as happening singly in 10 Trials with One Guinea, it follows, that as often as 6 can be taken, or combined, in 10, so

often must the Probability be of the 6 Heads turning up in the First 6 Trials or Times of throwing up be repeated to find the Probability required.

Reasoning thus from the *general Rule*, in the *Practical Arithmetician*, p. 416, for determining the Number of *Combinations* and *Changes* of Things,

$\frac{n}{1} \times \frac{n-1}{2} \times \frac{n-2}{3}$ &c. to t Terms, = the Number of *Combina-*

tions of t Things taken out of n Things sought. Hence, $\frac{n}{1} \times \frac{n-1}{2} \times$

$$\frac{n-2}{3} \times \frac{n-3}{4} \times \frac{n-4}{5} \times \frac{n-5}{6} \times \frac{m^t}{m+p} \times \frac{p^{n-t}}{m+p}$$

= $\frac{105}{512}$ the Probability required: the Odds being as 407 to 105, or as 3 $\frac{7}{8}$ against, to 1 for happening, nearly. *W. W. R.*

Mr. *Stephen Hartley* of *Sowerby Bridge* says, that this Question is answered in *Miscellanea Curiosa*, Vol. II. p. 23. where the Chances demanded stand thus: 1 + 10 + 45 + 120 + 210 + 252 + 210 = 848 against, and 120 + 45 + 10 + 1 = 176 for, the Chances of happening. Divided by 16, the Chances are 11 for, to 53 against, happening: being as 1 to 5 for and against happening.

Remark. The Chances of this Computation being *right* to those of its being *wrong* are greater Odds. PAL. AUTHOR.

Mr. *Cartill*, from *Tab. Miscellanea Curiosa*, Vol. II. p. 21, gives the Answers as before.

IV. QUESTION 588, answered by Mr. Alex. Rowe of Cornwall.

Put $a = 18$, $b = 1000$ Inches (instead of 100 printed by Mistake) $n = .7854$, $x =$ Parallelogram's Breadth, and $x + a =$ its Length. Then (47. e. 1) $2x^2 + 2ax + a^2 =$ Square of the Parallelogram's Diagonal, or of the circumscribing Circle's Diameter.

Hence, by Quest. $2x^2 + 2ax + a^2 \times n - x^2 + ax = b$. Reduced, $x^2 + 18x = 1306.114926$. From whence $x = \sqrt{1387.114926} - 9 = 28.244$ Inches, *ferè* = Parallelogram's Breadth; consequently its Length = 46.244 Inches, and Area = 1306.115 sq. Inches = 9.07 Feet. *W. W. R.*

Remark. Several of our Correspondents observe, that a Solution to this Question is impossible from the *Data* printed.

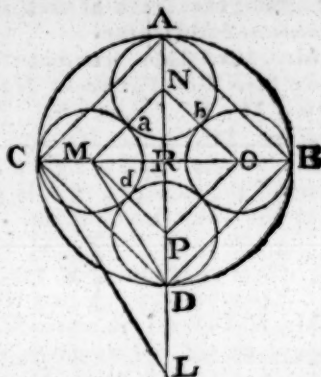
Mr. *Joseph James* answers it correctly, in the same Method, and very nearly the same Numbers, by supplying the Defect of 100 to 1000 Inches; as did Mr. *Robinson* of *Biddick*, Mr. *Richard Batho* of *Tilstock*, near *Whitchurch*, *Shropshire*, Mr. *W. Spalton* of *Renishaw*, and Mr. *John Shadgett* of *Ros*, *Hertfordshire*, and Mr. *Cartill* answered it. Mr. *Matthew Habbershon* of *Sheffield* gave a Solution, by supposing the Difference of the Sides 56 instead of 18. Mr. *Jos. Moulds* of *Old-street*, *London*, answered it truly, as did Mr. *Veck* of *Cobham*.

V. QUESTION

V. QUESTION 589, answered by Mr. Isaac Rowbottom of Westhallam.

Construction. In the given Circle, let the Square ABDC be inscribed, and in the Diagonal produced, take $DL = \frac{1}{2}DC$, draw CL, and || thereto let DM be drawn meeting BC in M; make AN, BO and PD each = CM, and from the Centers, M, N, O, and P, with a Radius = CM, describe the four equal Circles C a d, A a b, &c. which will represent the Four Sons Shares, respectively.

Demonstration. The Triangles DMP, and CDL are equiangular, and $CD = 2DL$, by Construction: consequently $PM = 2DP$, whence it is evident, that the Circles touch each other.



Calculation. The Diam. $AD = \sqrt{\frac{2420000}{.7854}} = \frac{1100\sqrt{2}}{\sqrt{.7854}} = 1755.346333$

Yards; and the Side of the Square $CD = \frac{1100}{\sqrt{.7854}} = 1241.21709$; whence, by

Sim. $\triangle s RL : RC :: RD$; $RM = 514 \times .12895$. Then, $RC - RM = CM = 363.5440665$ the Radius of the Circles. Th. $CM^2 \times .31416 = 85.786419$ Acres = each Son's Share; and $PM^2 - CM^2 \times .31416 = 23.44026$ Acres, the Wife's Share; consequently, $\frac{500}{4} - 3.3562 \times CM^2 = 33.353516$ Acres, the Share of each Daughter.

	Acres.	Acres.
Each Son's Share	$85.78641 \times 4 =$	343.14564
Each Daughter's Share	$33.353516 \times 4 =$	133.414064
The Wife's Share	23.44026	23.44026

Proof Sum 499.999964 Acres. W.W.R.

Remark. The above is a masterly and correct Answer, fit for a Pattern Solution. Those who will not take the same Trouble and Attention to be elegant and correct, cannot expect to be crowned with Laurels, like those to whom they are due as a just Reward.

Mr. Lamb of Sproatly, near Hull, gave

	Acres.	Acres.
Each Son's Share	$85.786 \times 4 =$	343.144
Each Daughter's Share	$33.355 \times 4 =$	133.420
Wife's Share	23.435	23.435

Proof Sum 499.999 W.W.R.

Mr. John Gedney of Sproatley, answered it as correctly; so did Mr. J. Moulfield, London, by a curious Construction.

Mr. Joseph James of Stoke Bishop, gave

Acres.	Worth. £.	Acres.	Worth. £.
Each Son's Sb. 85.786472 ; 2144.661806		4 Sons 343.145889	8578.64725
Each Daug. Sb. 33.70120 ; 826.78		4 Daug. 132.284802	3307.12005
Wife's Share 24.569309 ; 614.23275			24.569309 ; 614.23275

The Land worth 25 £. an Acre.

Sum 500.000000; 12500.000000

Remark.

Remark. The above Solutions by Mr. Lamb, Mr. Gedney, and Mr. James, confirming the Truth of each other, were all given by a concise and correct analytical Investigation.

Mr. Alex. Rowe determines the Shares of Land with the same Accuracy; as did Mr. John Fletcher of Nantwich; Mr. George France, Mr. Thomas Robinson, Mr. W. Spalton, Mr. John Buckley of Coln, Lancashire; Mr. Penn of Chalfont, Mr. Stephen Hartley, and Mr. J. Cartill of Walkington.

Mr. Thomas Smith has given Multipliers into 500, to determine each Person's Share of the Acres, to serve in general for any Number of Acres, in a Circle to be divided as by this Question.

$$\begin{array}{l} .171669347 \\ .06660393741 \\ .04690685473 \end{array} \left. \begin{array}{l} \text{Acres} \\ \times 500, \text{ or} \\ \text{any No.} \end{array} \right\} \left. \begin{array}{l} \text{Sons,} \\ \text{Daughters,} \\ \text{Mother's} \end{array} \right\} \text{Share.}$$

Mr. R. Dutton gave a near Solution. Mr. Matthew Habberston of Sheffield gave an elegant and complete Solution, delineated and proved. Mr. Lamb of Sproatley, near Hull, gave also an analytical and correct Solution; as did Mr. R. Witter of Clotton, Cheshire, and Mr. Wm. Veck, Land-Surveyor at Cosham near Portsmouth.

VI. QUESTION 590, answered by Mr. Joseph James.

Put $a = 117\,752\,053$ Feet, = Radius of the Circle circumscribing an Acre, and $x =$ Length of the Rope sought. And since the Rope is to be fixed at the Verge of the circular Meadow, and the Horse to feed but Half an Acre, we

have, by the Property of the Circle, $2 \times \sqrt{x^2 - a^2} = x$, hence $x = \sqrt{\frac{4a^2}{3}}$

Feet. $= 135\,710\,702$ the Length of the Rope, 45.2369 Yards, required.

Mr. James proceeds from the above Particular to a general Solution with great Diligence, and greater Accuracy, who, by analytical Investigation, determines the correct Length of the Rope to be 135.685511 Feet = 45.2285 Yards.

W. W. R.

Mr. Robinson of Biddick, by an elaborate Process, and exact Figure, determines the Length of the Tether or Rope to be = 45.204 Yards.

Mr. W. Spalton of Renishaw determines by an analytical Process and Figure, the Tether's Length = 47.8559 Yards, which is doubtful.

Mr. John Gedney of Sproatley, by an elaborate Process determines the Length of the Tether = 45.42 Yards, agreeing with Mr. James's particular and general Solution; and nearly with Mr. Robinson's Numbers.

Mr. John Fletcher of Nantwich finds the Tether's Length, by an analytical Process, depending on Hutton's Mensuration, to be = 8.26971 Poles = 45.4834 Yards.

Mr. W. Marsden of Netterburn, Derbyshire, puts $b =$ Diam. of the circular Ground, $x =$ Length of the Rope sought, $a = 10$ Chains, $p = .7854$;

then, by Proportion of Inches, $\frac{a}{p} = b^2$, and $b \times .5793 = x = 45.4789$

Yards, the Tether's or Rope's Length: being a very near Answer, and therefore his Method and Mr. James's are preferable to tedious and intricate Solutions; serving more for Speculation than useful Practice.

Mr. Stephen Hartley, by a near Process finds 8.2732 Poles = 45.502 Yards, the Rope's Length.

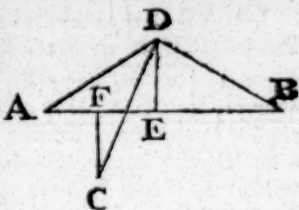
Mr. Alex. Rowe determined the Rope's Length = 45.45 by a short Method.

Mr. Lamb of Sproatley, by an analytical Process determines the Tether's Length = 45.496 Yards.

Mr. J. Cartill 2.0671807 Chains.—But Mr. W. Veck of Cosham, Land-surveyor, 45.213 Yards, confirming Mr. James's Pattern Solution.

VII. QUESTION 591, answered by Mr. Isaac Rowbottom of Westhallam.

Let ABC, be the three Points given, and D the Point required. Draw DE, CF \perp AB; join AD, DB, DC and AB, and put AB = a , AF = b ; AB - AF = m ; CF = n , FE = x , and DE = y . Then, $n + y \mid^2 + x^2 = DC^2$; $b + x \mid^2 + y^2 = AD^2$; and $m - x \mid^2 + y^2 = BD^2$. Hence, by exterminating x and y , the Value of each may be found.



Remark: This Question, Mr. Rowbottom and Mr. John Fletcher inform us, is the same with Prob. 57, p. 171, *Simpson's Exercises*; from whence it appears to be taken; where the Solution, different from the above, both algebraical and geometrical, may be seen.—Mr. Alex. Rowe informs us the same, who has given an analytical Solution; as has also Mr. Robinson, and Mr. Cartill of Walkington, near Beverley, Yorkshire, by an accurate Process. Also Mr. Wm. Veck confirms the Pattern Solution above.

VIII. QUESTION 592, answered by Mr. Isaac Rowbottom.

Let ABC be the required Δ , draw EF \parallel AB, and = 830 Feet, let G be the Point, in the Side AB; join EG, GF. Then, in the Δ EFG, all the Sides are given, the Angles being known. Whence all the Angles in the Δ s AEG, GFB, ECF, and the Sides EG, GE, and EF are also known; whence the Sides of the Δ ABC are found = 688.0231244, 1293.0595912, and 1355.1408729.



Remark. In the above Solution EF \parallel AB = 83 Feet, which was not given, and therefore makes the Answer differ from all others, with no Side of the inscribed Δ , \parallel to any Side of the circumscribing One.

Mr. Alex. Rowe determines, by his Process, (of all Sides of the inscribed Δ oblique to the circumscribing Sides,) the Sides of the circumscribing Δ very different from the above Sides, limiting the Question by the Side EF \parallel AB; the Question before being evidently unlimited. Mr. W. Spalton has limited the Quest. by supposing EF (as above) \parallel AB, and thence finds the Sides of the circumscribing Δ = 1355.039 = AB; 1293.06 = AC; and 688.99 = CB.

Construction.—He first draws the Δ EFG representing the given Distances of the Three remarkable Points; then he lets fall the Perp. and draws AB \parallel EF; and also draws the Lines EC and FC, making the Angles of 30° and 70° with the Line EF; which Lines being produced will cut the Line AB, in the Points A and B, when the Δ ACB will be the Δ required. Where EF and all the Angles of Δ ECF being given, EC and CF are found = 791.98 and 422.37 Feet, respectively, very near. Also the Angles of Δ s AEn and BFm: and En and Fm being given, AE and An are found = 501.08 and 433.85, nearly. And BF and Bm = 266.62; and 91.189 Feet, nearly. Whence, AB = 1355.039, AC = 1293.06. and CB = 688.99, nearly. W.W.R.

Mr. George France limits this Question by supposing the circumscribing Δ to be a Maximum; drawing a Construction accordingly, and determining the Sides.

Mr. James Lamb has given an Answer, by a curious geometrical Construction and numerical Calculation, and determined thereby the circumscribing Δ : but as the Data are defective; so must be the Answers built upon them. Mr. Habberston's Answer falls under the same Dilemma.

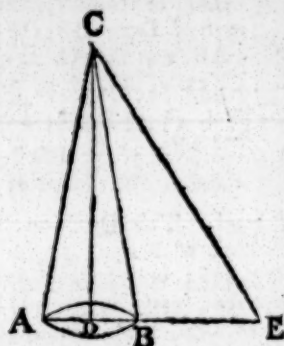
Mr. Cartill of Walkington, near Beverley, has given a familiar Construction, demonstrating by Segments of Circles, containing the Two given Angles of the Triangle proposed, drawing Two Triangles only to the same, that the Question may have innumerable Answers. Mr. Wm. Veck observes the same.

IX. QUESTION 593, answered by Mr. Joseph James of Stoke Bishop;

Let ABC represent the Cone of Marble. Put $a = CD = 20$ Feet, and $x = DE$, then (47 c. 1) $\sqrt{x^2 + a^2} = CE$; and since, by *Mechanics*, the Application of a Weight or Power applied to the Rope, fixed at the Vertex of the Cone, is the Angle which the Line of Direction of that Weight or Power, makes with the Cone, we have, by Trigonometry,

$$\sqrt{x^2 + a^2} (CE) : 1 :: x (DE) : \frac{x}{\sqrt{x^2 + a^2}} =$$

Angle DCE, which, by Quest. must be a Maximum. In Fluxions and reduced, $x = 13.2278$ fere, = Length of the Rope; making an Angle with the Top of the Cone = $33^\circ 28'$. W. W. R.



Mr. George France, by an elaborate Process, has confirmed the above Solution by Mr. Joseph James. He determines that the transverse makes an Angle with the Perp. or Axis of the Cone = $33^\circ 28'$ as above; whose Supplement to $180^\circ = 146^\circ 32'$, the Angle which the Rope must make with the Perp. of the Cone, before it can be moved. Mr. Wm. Veck, Land-Surveyor of Gosport, near Portsmouth, confirms the Pattern-Solution.

X. QUESTION 594, answered by Mr. Joseph James.

1. To find the Value of the Daughter's Expectation.

Put $N = 584$ = Number of Persons living out of 1000, at the given Age of the Daughter, $n = 315$ = those living at the given Age of the Mother, $s = 21 - 11 = 10$ Years, $L = 533$, those living at $11 + t$ Years, $l = 230$ = those living $50 + t$ Years, $D = N - L = N^\circ$ Persons dead in t Years after the Daughter, and $d = n - l = N^\circ$ of Persons dead in t Years after

the Mother, then by Doctrine of Chances, $\frac{Nn - Dd}{Nn} = \frac{11975}{12264} = .976425 =$

Probability of the Daughter's living 10 Years, that is, to the Age of 21 Years. And the present Value of 1*l.* at 4 per Cent. comp. Int. = .67856. Hence, $.976425 \times .67856 \times 1000 \text{ £.} = \text{£. } 659.640428$, the Value of the Daughter's Expectation.

2. To find the Value of the Mother's Expectation.

Let $M = 16.97$ the Value of the Daughter's Life, $N = 11.75$ the Value of the Mother's Life; $R = 1.04$, the Amount of 1*l.* per Year; $r = .04$ the Int. of 1*l.* for a Year; then, by Corol. 2d Prob. xv Emerf. Miscellanies, the

$$\text{Value of the joint Lives of the Daughter and Mother} = \frac{MNR}{M + N + r + MN} =$$

10 Years, nearly. But the Value of the Life of the Expectant (the Mother) = 11.75, from which take 10, and there results $1\frac{3}{4}$, for the Value of an Annuity, equivalent to 1000*l.* which, in the present Case, is worth 70*l.* being the Value of the Mother's Expectation.

But, Should it be considered, that the Mother is to have the entire Disposal of the Legacy, when in her Possession, then, from the same Way of Reasoning, the Mother's Expectation will be worth 2.4583 Years Purchase, or 98.2324 £.

3. To find the Value of the Son and his Heir's Expectation.

Let $M = 11.75$, the Value of the Mother's Life, $R = 1.04$ the Amount of 1*l.* for a Year, $r = .04$ the Interest of 1*l.* for a Year, then the Value of

an Annuity upon Two joint Lives that are equal, whereof the common Age is that of the older (viz. the Mother's) equal $\frac{RM}{2-M} = 8$ Years nearly.

Put the Sum of any single Lives $= 23.5$, wherefore $23.5 - 8 = 15.5 =$ the Value of the longest of Two Lives, whose Ages are 50 each; which, taken from the Perpetuity 25, leaves 9.5, the Half of which $= 4.75$.

Again, the Expectation of a single Life, whose Age is 11 Years $= 38$ Years, and the Expectation of a single Life of 50 Years $= 19$ Years. Then, as $38 : 19 :: 4.75 : 2.375 =$ the Number of Years Purchase required: being worth 95 £, which is the Value of the Son and Mother's Expectation.

N. B. The above Solution is founded on the Hypothesis laid down by Mr. Emerson in his *Miscellanies* lately published, who considers the Extreme of old Age to be 88 Years.

Mr. Wm. Veck is the only Person answering this Question, besides Mr. James.

XI. QUESTION 595, answered by Mr. Joseph James.

Let $A = 2.6$ £ = Annuity, or annual Interest; $P = 52$ £ Principal, $r = 1.05$; $t = 52$ = Number of Payments in the Year; and s = Number of Years in which a Principal will be discharged. Then, according to De-

$$\frac{\frac{1}{t} A - \frac{1}{t} A}{\frac{1}{t} A - A} = P. \text{ Now, put } a = .0487902 = \text{Hyp. Log. } r,$$

$$\text{then } A - \frac{A}{r^s} = AP. \text{ Also, } \frac{A}{r^s} = A - aP; \text{ and } s = \frac{A}{A - aP}$$

$= 41,329,145$, which put $= M$, then $s = \frac{\text{Log. } M}{\text{Log. } r} = 76.277$ Years, for the Time required.

Mr. Richard Batbo of Tisbury makes the Time $= 3985.4$ Weeks, $= 74$ Years, 29,4 Weeks.

Mr. Isaac Rowbottom thinks Mr. Penn means to find how long an Annuity of 1 s. per Week must continue, so that the present Worth may be $= 52$ £, allowing 5 £ per Cent. If so, let $p = 1040$ Shillings, $r = 1.05$ the Interest of 1 Shil. for 1 Week, $t =$ Time, then $t = \sqrt[2]{\frac{p}{r}} + \frac{1}{2} = 28.3888$ Yrs.

W.W.R.

Mr. Cartill, by a different Process, makes the Time different in Two Answers; which we mention lest he should think his Solutions the most correct; and advise his taking more Time to determine, and to write sooner, before the *Palladium* be compiled, and not to rely too much on *Cottingham* Aid.

Mr. Jos. Mouldsall of Old-street, London, by analytical Deduction and Theorem makes the Time $= 28.24$ Years, confirming Mr. James's Solution. Mr. R. Witter confirms the same Truth, by a concise Process. Mr. W. Veck, Land-Surveyor, at Cisham, near Portsmouth, confirms the same Truth.

XII. QUESTION 596, answered by Mr. Joseph James.

Put $c = 10$ £ = Annuity; $p = 100$ £, $r = .05$; then, by General Rule, given in Case IV. p. 347, *Practical Arithmetician*, 1st Edition, we have $\sqrt[n^2 + 8pc]{n} - n (n = 2c - re - 2pr) = 12.641589$ Years $=$

Time of discharging the Principal.

G

Mr.

Mr. *Robinson*, by an analytical Process, makes the Time = 14.2867 Years; being a Doubt, Mr. *John Parker*, by his Process, determines the Years = 12.641, confirming Mr. *Joseph James's* Solution.

Mr. *Alex. Rowe*, by his Process, makes the Time = $14\frac{1}{3}$ Years = 14.2 Yrs. Mr. *John Fletcher* deduces the Time 14.206 Years, by his Process, when the Debt will be discharged. Mr. *Stephen Hartley*, 12.6146 Years.

Mr. *John Buckley* of *Coln, Lancashire*, 12.6416; Mr. *Cartill* of *Walkington, Yorkshire*, by a Process, 12.641657 Years, confirming the foregoing Solutions.

Mr. *Jos. Moulsdale*, taking 5 £. per Year from the Annuity to pay the Interest of the Debt, deduces the Time by a Process = 14 854 Years; but making the Annuity 10 £ a Year equal to the Amount of 100 £, the Time comes out 12 641 Years; which he calls erroneous, because the Creditor loses the Interest of his Principal.

Mr. *W. Veck* of *Cosham* gives nearly the same Numbers.

Mr. *R. Witter* 14.206 Years.

XIII. QUESTION 597, answered by Mr. Joseph James.

Writers on Mathematical Philosophy have proved, that the Force of Gravity, above the Earth's Surface, is, *inversely*, as the Square of the Distance from the Earth's Center; and since any Weight of Gravitation diminishes according to the Height above the Earth's Surface, it follows, that the greatest Weight of Gravitation of a Pound will be at the Center of the Earth.

XIV. QUESTION 598, answered by Mr. Isaac Rowbottom of Westhallam.

$$\text{Given } \left\{ \begin{array}{l} 1 | m + w + x + y + z = 37 \\ 2 | w^2 \times y - x - z = 35 \\ 3 | wz + w + z = 53 \text{ (not as printed)} \\ 4 | xy + wz = 59 \\ 5 | my - x \times wz = 3000 \end{array} \right. \left. \begin{array}{l} \text{To find } w, \\ x, y, z, \text{ and} \\ m. \end{array} \right\}$$

Transl. 3 | 6 | By a few Trials, wz is found = 40, and $w + z = 13$.

Transl. 4 | 7 | $xy = 59 - wz = 59 - 40 = 19$, and $x = \frac{19}{y}$ wh. Num.

Consequently, y must be either 19 or 1. If $y = 19$, $x = 1$, $z = 8$, $m = 4$, $w = 5$.—Hence, the Remedy is DEATH.

Mr. *Robinson* of *Biddick* answered it analytically and methodically, similar to the above Solution. Mr. *Jos. Moulsdale*, London, logically and poetically. Mr. *W. Veck* of *Cosham*, analytically.

Mr. *Joseph James* answered it logically and analytically.

Mr. *Alex. Rowe*, Mr. *John Fletcher*, Mr. *Geo. France*, Mr. *Dutton*, by an elaborate and tremendous Solution, Mr. *Stephen Hartley*, Mr. *Mattbew Habberston* of *Sheffield*, Mr. *Thomas Wood* of *Stoke Godding, Leicestershire*.

XV. QUESTION 599, answered by Mr. Alex. Rowe.

Put $a = 2$, $b = 1728$ cubic Inches, $c = .7854$. x & $2x$ = internal Length and Diameter of the Cask, respectively. Then, $x + a$ = whole Length, and $2x + a$ = whole Diameter. Also $2x + a$ | $2 \times x + a$ | $2 \times x + a \times c$, = Cask's whole Content; and $2x$ | $2 \times x \times c$ = its internal Solidity.

Hence, by Question, $2x + a$ | $2 \times x + a \times c \rightarrow 2x$ | $2 \times x \times c = b$.

Reduced $x^2 + \frac{5a}{8}x = \frac{b}{c} - a^3$. By comp. Sq. and extract, the Root

$$x = \sqrt{\frac{b^2 - a^3}{c} + \frac{5a}{16}} : - \frac{5a}{16} = 11.09678; \text{ whence}$$

$2x = 22.19356$ Inches, and $4cx^3 = 4292.81147$ solid Inches. *W.W.R.*

Mr. Stephen Hartley's Answer.

Put $a = 1728$ Inches in a solid Foot; $b = .7854$, and $x =$ Inches of the external Length of the Cylinder; then will $2x =$ the external Breadth, and $4bx^3 =$ external Solidity, supposing the Whole to be solid. But the internal Length, Breadth, and Solidity, by Quest. is $x = 2$, $2x = 2$, and $4bx^3 = 16bx^2 + 20bx - 8b$, respectively. The last taken from the external Solid, there remains $16bx^2 - 20bx + 8b = a$. In Numbers, and divided by 16, then $x^2 - .625 = 11.7218$. Therefore $x = 12.3486$, and the internal Solidity $= 4185.0797$ Inches. *W.W.R.*

Mr. Jos. Mouldale, 4182 solid Inches. *Mr. R. Witter*, 4185.045 solid Inches, confirming the above Solution.

Mr. Robinson of *Biddick* determines, by a short Process, 11.726 Inches the Height, and 23.452 Inches the Diameter required. *Mr. Matthew Habberston*, by another short Process, determines 12.974 the external Length, 25.942 the external Diameter. Also 10.971 = internal Length, and 23.943 = internal Diameter. *Mr. Spootley* determines 12.2371 Inches the Length of the Cask, which, being doubled (he says) = 24.474 Inches = Breadth or Diameter; whence the Solidity = 5756.818 cub. Inches. *Mr. Geo. France*, also *Mr. Fletcher* of *Nantwich*, give widely different Solutions; as did *Mr. Spalton*, *Mr. Thomas Walker* of *Tankerly Common Side*, near *Barnsley*, *Mr. John Shadget* of *Ross*, *Mr. Jos. James*, *Mr. John Buckley* of *Coln*, and *Mr. W. Veck* of *Cosham*. *Mr. J. Cartill* of *Walkington* finds, by a short Process, the Diameter of the Head = 14.832911 Inches.

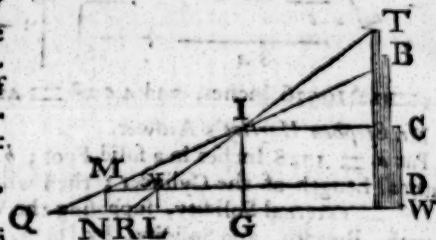
Though here are different Solutions, disagreeing in their Comparisons in some Respects, yet *Mr. Alexander Rowe's* and *Mr. Hartley's* Solutions, from right Principles, nearly correspond, and may be considered as demonstrative Answers. Notwithstanding the foregoing Proofs of Truth, *Mr. Ralph Kingsley*, *Cheshire*, who is a professed Critic, is pleased to inform us (if he forms a right Idea of the Nature of the Question) the Question is unlimited, and has neither a Maximum or Minimum: That the Thickness and whole Content of the Wood being given, also Proportion of the Length to the Breadth being given, therefore the Content of the Cask is also limited, and consequently can have neither Maximum or Minimum. This Correspondent prefers mechanical Questions to those of any other Speculations.

XVI. Unintelligible QUESTION 600 (proposed by *Mr. Chipchase* of *Stockton* upon *Trent*) answered by *Nobody*.

This is the Effect of Questions sent us without Solutions, when we take the Proposer's Word, that he will send an Answer in due Time; or when a Proposer puzzles himself to puzzle us: Or, being a Man of Consequence, is ashamed to produce his real Name.—Such Correspondents are of Consequence to themselves; but are of no Account to us and demonstrative Science.

THE BRITISH PALLADIUM, OR
XVII. QUESTION 601, answered by Mr. Isaac Rowbottom,

Let TW represent the Tower; QW the Horizon; IG the Wall; L the 1st Place of Observation, N the 2d. Make MN = 5 Feet, the Height of the Eye; draw MD || IC, and KL ⊥ QW; join RT, QB. Then, $QG = \frac{1080}{7}$, and $GR = \frac{360}{7}$ Feet. Th.



by sim. Δ s, as $GQ : IG :: IC : BC$; and as $GR : IG :: IC : TC$, hence by Equality, as $GQ : GR :: TC : BC$; and, by Division, as $GQ - GR : QG :: IC - BC (TB) : TC$. But $GQ - GR = \frac{3}{4} GQ$. Therefore, $TB = \frac{3}{4} IC$; also, by Quest. $TB = \frac{1}{4} TW = \frac{1}{4} TC + \frac{1}{4} CW = \frac{1}{4} TC + 3$. Th. $TC = \frac{36}{5} = 7\frac{1}{5}$ Feet. Hence, $TW = 19\frac{1}{5}$ Feet, the Tower's Height; and $GW = 30\frac{6}{7}$ Feet, the Distance of the Wall from the Tower. *W.W.R.*

Answered by Mr. John Shadgett.

Put x Feet = Tower's Height, then $\frac{30 \times x - 5}{7}$ = Distance of the 1st and $\frac{90 \times 3x - 5}{7}$ = Distance 2d Place of Observation from the Tower's Base.

Therefore, $\frac{90 \times 3x - 5}{7} - \frac{30 \times x - 5}{7} = 20 \times 3 = 60$ Feet. Reduced $x = 48$. Therefore, $4x = 19.2 = 19\frac{1}{5}$ Feet, the Tower's Height; and its Distance from the Wall = 30.857 Feet nearly. *W.W.R.*

Mr. John Buckley of Colne, Lancashire, answered it, by a Process, in the same correct Numbers; as did Mr. W. Spalton, by a curious Figure or Draft. Also Mr. John Gedney of Sproatley, near Hull, Yorkshire; Mr. Matthew Hoberghon, Mr. John Peck of Singleton, near Beverly, Mr. Stephen Hartley, Mr. Alexander Rowe, Mr. Thomas Walker of Tankersley Common Side, near Barnsley, Yorkshire; Mr. Thomas Robinson, Mr. W. Penn, and Mr. Cartill of Walkington, Yorkshire, answered it correctly; also Mr. Richard Witter of Clorton, Mr. Jos. Mouthdale, late of Manley, Cheshire, now of Old Street, London, by a Construction and Process; also Mr. W. Veck, Land-Surveyor, of Cossiam, near Portsmouth, accurately.

XVIII. QUESTION 602, answered by Mr. W. Netherhurst.

By Experiment, the Length of an Organ Pipe, sounding D, Two Octaves below D, in the Middle of the open Diapason, was found 21.6 Inches; and its Diam. 1.9 Inch; then, the Ratio of D to C (or an 8th + 7th) being 5:18 or $\frac{5}{18}$, and of D to A (or 2 8ths + 5th) = $\frac{5}{775}$ the Breadth of a Pulse, or Wave of Air of each String, sounding C and A respectively.

To find the Distance of Time between each Beat?

Let $N = 232,96$, the Vibration of C; $\frac{n}{m} = \frac{3}{5}$ the Ratio of a 6th, $\frac{q}{p} = \frac{1}{5}$ of a Comma; then $\frac{161p + q}{29} + \frac{1}{mN} = .346$ Parts of a Second, the Distance of Time between each Beat, and also the Length of a Period of the least Imperfections.

To find the Length of a Cycle of the Pulses.

If $AB : ab :: 403 : 402$, the Internal of these Seconds, is $\frac{1}{5}$ of a Comma nearly; and the Vibrations of imperfect 6ths being 5 AB and $5 \times 3 ab$; then,

then, as 15 AB : 15 ab :: 403 : 402, whence $402 \times 15 \text{ AB} = 403 \times 15 \text{ ab}$
 $= 2430090$, the Length of a Cycle of Pulses.

Lastly, The Cycles and Periods of Pulses are nearly the same Length, whether the Temperaments be sharp or flat. See *Smith's Harmonics*, p. 106.

W.W.R.

XIX. QUESTION 603, answered by Mr. Thomas Robinson.

Given $\sqrt[3]{\frac{2}{3}} \sqrt[3]{\frac{3}{2}} = \sqrt[3]{\frac{66}{120}} = \sqrt[3]{\frac{11}{20}}$. Put $x = \text{Hyp. Log. } \sqrt[3]{\frac{2}{3}}$,
 $n = \frac{1}{2}$; then, the Log. $ax^n = a \text{ Maximum}$ (rectified a *Minimum*). In
 Fluxions $x^n + nx^{n-1} = 0$. But $x = \sqrt[3]{\frac{11}{20}}$, Th. $x^{n-1} + nx^{n-1} = 0$
 Reduced $x = -\frac{1}{n} = -2$, Hyp. Log. $\sqrt[3]{\frac{2}{3}}$, and thence, Hyp. Log. $x = -\frac{4}{3}$

$= -1.333333$, &c. which multiplied by the *Modulus*, $.434298 = -.579059$
 $= \text{Com. Negative Log. whose natural Number is } .263597$, which multiplied by
 $112 \text{ lb.} = 29.523 \text{ lb.} = 1 \text{ q. } 1 \text{ lb. } 8 \text{ oz. } 54 \text{ r. } 85 \text{ required.}$

Mr. Alex. Rowe, the Proposer, determines the Hyp. Log. $= x = -1.33333$
 &c. but missed the nat. Number by making it $= .37937$ &c.

Mr. Lamb of *Sproatley* accurately solved this Question.

Mr. J. Cartill of *Walkington*, near *Beverly*, reduces the Expression to $\sqrt[3]{\frac{2}{3}} \sqrt[3]{\frac{3}{2}}$
 as above; and gave the same true Answer with Mr. Robinson, above, by the
 same Method.

XX. QUESTION 604, answered by Mr. Alexander Rowe.

By *Mechanics*, as $40 : 1 :: 20 : \frac{20}{40} = \frac{1}{2}$ Hundred Weight, the Force with
 which the Ton Weight tends to descend down the Hill. Th. $20 - \frac{1}{2} = 19\frac{1}{2}$
 Hundred Weight, required.

Mr. George Farmer answers thus: By the *Quest.* we have 40 Yards : 1 Ton ::
 1 Yard : $\frac{1}{40}$ Ton, the Weight or Force, sufficient to keep the given Weight in
Equilibrio, on a Road that rises 1 Yard in 40. Th. 1 Ton $-\frac{1}{40} = 19 \text{ C.}$
 2 Qrs. the Weight required, agreeing with Mr. Rowe's Numbers.

Mr. Dutton's Answer. Let the Horizontal Distance = 40 Yards, and Perp.
 Ascent in that Distance = 1 Yard, then the Length Slope = 40.012 Yards.

By *Emer. Mechanics*, Prop. XIV. As 40.012 : 1 :: 1 Descent : 55.983, the
 C. lb.

Power that sustains the loaded Carriage on the Ascent. Whence, $20 - 55.983$
 C. Qrs. lb.
 $= 19 \frac{1}{2} 0.07$ the Weight required.

Mr. Joseph James answered this Question like Mr. Dutton, as above, by
 considering the Ascent as an inclined Plane, compared with the level Road, of
 one Yard Perpendicular to 40 Yards Base; the Proportion of Power (by *Me-*
chanics) to sustain a Weight on an inclined Plane, being as the Perp. to the
 Base of the Triangle. Put $x = \text{Power}$, sustaining the Weight; then as
 Yd. Yds. Ton.

.1 : 40 :: x : 1. By Extremes and Means, $x = \frac{1}{40} = \frac{1}{2} \text{ C. Weight.}$ Con-
 sequently the Ton Weight must be lessened, that an equal Number of Horses

may draw $19\frac{1}{2}$ with the same Facility, up a Hill, rising 1 Yard in 40, as they
 can draw 1 Ton on a level Road.

W.W.R.

Mr.

Mr. Joseph Moulfdale answered it in a *similar Manner*, very scientifically; as did Mr. William Veck, Land-Surveyor, at *Cosham*, near *Portsmouth*.

XXI. (Curious and Useful) QUESTION 605, answered by Mr. Richard Judson of Beverly, Yorkshire.

By the Nature of the *Quest.* the Sum of all the *Deficiencies* of yearly Simple Interest to 80 *l.* taken, severally, from the former Years *Principal*, together, must make up 1500 *l.* when that Sum is exhausted: for it cannot be exhausted if more *Deficiency* of Interest could be taken away.

The 1st Year's <i>Principal</i>	= 1500	The Int.	60	Deficient of	80-20
2d Year's	1480		59.2		20.8
3d Year's	1459.2		58.368		21.632, &c.

Which *Deficiencies* are Terms of a Geometrical Progression, whose Ratio is $\frac{20.8}{20} = 1.04$.

Let $a = 20$, 1st Term, then ar^2 , ar^3 , ar^4 , ar^5 , &c. a geometrical Series, continued to n Terms; whose Sum = 1500.

By p. 401, *Practical Arithmetician*, (a , r , s , given, and l , r , required)

$$n = \frac{L. s \times r - 1 + a}{L. a} = \frac{L. 80 - L. 20}{L. 1.04} = 35.346 \text{ Years, required; when}$$

the Lady's *Legacy* of 1500 *l.* will be expended or exhausted.

W. W. R.

Remark. The above Solution is a proper Explanation of the Subject, and therefore a fit Pattern Solution.

Otherwise, by Mr. Judson:

Put $x = \text{Years required}$. Then, $a + ar + ar^2 + ar^3$ (to x Terms) = $s = \frac{ar^x - a}{r - 1}$, or $ar^x = rs - s + a$. In Logarithms, $\text{Log. } r \times x = L. rs - s + a - L. a$,

whence, $x = \frac{L. rs - s + a - L. a}{L. r} = \frac{L. 80 - 20}{L. 1.04} = 35.346 \text{ Years, as before.}$

Mr. Alexander Rowe, without shewing a Process, or Reason of Solution, finds the Answer to be 35,34 Years. Mr. Thomas Robinson, by a Process, finds the Answer to be = 35.3529 Years.

Mr. Isaac Rowbottom of Westballam makes the following judicious Observation. As the Lady is to take as much from the *Principal*, yearly, as the Interest for that Year comes short of 80 *l.* it will be found (from a little Consideration) that this *Question* amounts to no more than To find in what Time 20 *l.* (the Difference between the 1st Year's Interest and 80 *l.*) put out at 4 per Cent. Comp.

Interest, will amount to 80 *l.* ?—Conf. Log. $\frac{80}{20} = 35.3460574 \text{ Years, ac-}$
L. 1.04

curately; for so long, and no longer, the Lady can take the Sum of the present Year's *Principal* and its Interest out of 80 *l.* when there will be no First *Principal* left. W. W. R.

Otherwise. It is evident, that the *Principal*, for the last Year, must be such, that when added to the Interest thereof, the Sum shall equal 80 *l.* which therefore will be $\frac{80}{1.04} = 76 \frac{12}{13} \text{ l.}$ consequently this *Principal* will be the last Term of a Series of geometrical Proportionals, whose 1st Term, and common Ratio,

are

are 20, and 1.04 respectively. Therefore, $\frac{n-1}{1.04} = 76 \frac{12}{13} \div 20 = \frac{50}{13}$,

and $n = 1 + \frac{\pounds. 30}{\pounds. 1.04} = 35.3460574$, as before.

$\pounds. 1.04$

Mr. John Parker of *Asbby de la Zouch*, truly answered this Question, by exercising the analytic Art in the Process.

Remark. These Sorts of Questions, as Utilities or Practices of Life, are preferable to Questions merely speculative not occurring in Practice.

N. B. We have received from *Walkington near Beverly, Yorkshire*, Mr. Cartill's Solutions, after the *Palladium Solutions* were compiled; yet we have introduced the Notice of their Agreement with other Solutions, or such Notice of them, as we could find Room for, according to their Merit. But if Correspondents will send their Productions late, our Notice of them must always needs be the less.

Mr. Cartill answers the foregoing Question by the Time required, in which 80*l.* Annuity will amount to 1500*l.* at Simple or Compound Interest 4 per Cent. At Simple Interest = 41.373925 Years, Compound 28.3488 Years, a Mistake: being 35.346 Years at Compound Interest, the only true Answer.

Mr. William Penn of *Chalfont* answers it correctly from the same Supposition of Compound Interest = 35.346 Years: but Reasons should have been given by both these Correspondents, as by the judicious Mr. Rowbottom, why the true Answer is the same as from that Annuity.

Mr. Richard Judson of *Beverly* has been demonstrative and explanatory in his Method of Solution; who is very capable of demonstrative Truth, and of writing with Propriety. He never makes absurd Criticisms on Things that are clear, nor confounds the Distinction of Ideas with Inconsistency, Inconclusion, Confusion, and Error.

Mr. William Hardy finds the Answer truly from an Annuity of 80*l.* paying off a Bond Debt of 1500*l.* according to 4 per Cent. Compound Interest = 35.346 Years correctly. At Simple Interest 4 per Cent. he makes the Time of paying 1500*l.* off with an Annuity of 80*l.* = 25.403912 Years; less instead of more Years by allowing Simple Interest, which is Nothing to the Purpose of the Quest. admitting but of one true Answer, at any Rate; Mr. James Lamb truly solved it: also Mr. Veck. The Fact is, in what Time will an Annuity of 80*l.* be worth 1500*l.* ready Money, at 4 per Cent. Comp. Int. when the Answer will be as he made it, = 35.346 Years only. See this Kind of Quest. answered, Ex. III. p. 336, *Practical Arithmetician*. Pal. Author.

Mr. Moulsdale finds 41.454 Years the Time 20*l.* Annuity at 4 per Cent. Simp. Int. will amount to 1500*l.*

Mr. Richard Witter judiciously observes that this Question may be solved the same as 12th, and the true Ans. at Compound Int. 4 per Cent. = 35.346 Years.

Mr. Witter proposed a new geom. Quest. we have not Room for. Pal. Auth.

PRIZE QUESTION not answered by a NEWTONIAN.

To the PALLADIUM AUTHOR.

SIR,

I designed to have given some Calculations of my own; for I am told there is a Book published in *Latin*, by a *Dutchman*, containing an Account of all the Observations, that have been made, and the Calculations of the Sun's Parallax from all these various Ways. I have been thinking to make Enquiry about it, that I might have a Data to work by. But there is no Time now.

In the Paper you sent me of *Diamond's* and *Walt's* Observations, there is omitted the interior Contact at the Beginning.

You

You say, in one *Letter*, that the three Volumes printed in 1769, 1770, 1771, contain all the Accounts of the *Transit* (of *Venus* over the *Sun's Disk*), in 1769; but as I do not know what the *Numbers* of these *Volumes* are, I do not know how to apply for them.

I doubt not but you have had some Attempts to solve this *Prize Question*. For my Part, though I have turned my Thoughts every way, I cannot find how the *Problem* can be solved from the *Data* here mentioned; for I can see no *Connection* between them; and therefore I must leave it to superior Judgments. I thought, indeed, to have tried to solve it from other *Data*; but to my Disappointment, can find none sufficient among all the *Observations* that have been made.

If any Person is acquainted with a *Method* of solving this curious *Problem*, it is to be hoped he will make it public; which, if he refuse to do, I am sure he is neither a Friend to Mankind, nor any Encourager of Science.

July 3, 1777.

A NEWTONIAN.

N. B. We received no Answer from any, notwithstanding so many Observers of this Transit were paid at the public Expence! Veré.

CORRECTIONS.

By Inattention (p. 58. l. 3. Pall. 1776.) it is said, by the *Pall. Author*, if the higher Wheel, at B, be more elevated, when the Spoke of the lower Wheel is *Perp.* to the level Ground, the Carriage will *overset*; which cannot be, till the Body of the Carriage be in such a *Position*, that a vertical Line drawn through it's Center of Gravity, falls without the narrow Space on the Ground; as the Carriage inclines, whereon the lower Wheel rests; for if that vertical Line falls within the narrow Space whereon the lower Wheel rests, the Carriage cannot *overset*; according to the known Principles of Mechanics.

For, PROPOSITION, If a vertical Line be drawn through the Center of Gravity of any Body to the horizontal Base, whereon that Body rests, if the Vertical falls within the Base, the Body will stand; but if it falls without the Base, the Body will fall down.

This Truth is proved by the *Oblique Towers* erected in foreign Countries, as well as from every Day's Experience at Home.

Corol. 1. The larger the level Base is whereon the Body stands, and the farther within it the vertical Line from the Body's Center of Gravity falls, the firmer that Body will stand.

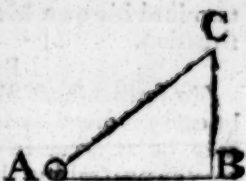
Corol. 2. The less the Space of the level Base, whereon the Body rests, and the less the vertical Line from its Center of Gravity falls within it, the easier the Body will *overset*, like a Carriage coming to a Poise, resting upon the narrow Verge of One Wheel.

Mr. Ralph Dutton asserts, that the Elevation of the Wheel of the upper Carriage must exceed 55.17 Inches (instead of 13.6 Inches, from our Mistake) before the Carriage will *overset*; but whether he is able to determine the exact Position of the Center of Gravity of a Carriage, on which the *Oversetting* is seen to depend, any more than determine its exact solid Inches, must be left to the Judicious to determine. However, we thank him for his Notice of our Mistake; though he seems to be got into a Wood (and not into an open Field) himself.

Mr. Dutton's new Method of finding the Distance a Ship sails, without the Use of a Log or Half Minute Glass, is as follows;

Suppose

Suppose A to be a Ball, whose Diameter is 1.128 Inches, its Weight 6 Oz. tied to a String CA, and immersed in the Sea, when the Ship is under Way. The Ball is sustained by the Resistance of Water, at an Angle of 30 Degrees, with the vertical Line CB. [He does not say how this Angle is to be measured, nor yet whether it varies]. Suppose CB any Number at Plea-



sure, as 10 Feet. By Trig. As the S. \angle BAC, 40° : CB, 10 Feet :: S. \angle ACB, 50° : AB, 11.92 Feet. Then, as 10 : 11.92 Feet :: 6 Oz. : 7.15 Oz. the Resistance of the Water against the Ball.

Now, find a Cylinder of Water = in Diameter to the Ball, and = in Weight to the Resistance.

Thus, $1.128 \times 1.128 \times .7854 = 1$ Inch ; and a cubic Inch of Water weighs .578697 Oz. Avoirdupois. Then, as .578697 Oz. : 1 Inch :: 7.15 Oz. : 12.3 In. = Length, and 1.128 Diam. whole Weight = the Resistance. Then, $12.3 \times 2 = 24.6 = 605.16$ In. which, reduced to Feet, gives 50.43 Feet, the Distance run in a Second of Time. Hence the Ship sails at the Rate of 43.1548 Feet, or 34.3 Miles an Hour.

We have corrected this Correspondent's Mistakes, who is a profound Critic. He sent 4.2 Feet the Ship sails per Second, instead of 50.43 Feet ; we corrected from his own Conclusion of 605.16 Inches a Second, and consequently 34.3 Miles an Hour, instead of 2.86 Miles sent ; which should revive the Spanish Proverb, "for no Man to throw Stones who owns Glass-Windows." If the Pilot be lost (in an open Sea or Field) well might the Ship ; he was pleased to inform us about the Carriage said to overset when it did not. Whether the foregoing Method will equal or rival that by the Log or Half Minute Glass, is submitted to the Practical Navigator, our Opinion (not Opinion) is that it will not.

Mr. Jos. Moulsdale of Manley, Cheshire, sends what he calls a Correction of the Solution to QUEST. XVII, P. 54. PAL. 1777 ; but draws not the Fig. correctly to agree with the Idea, nor agrees with the true Ans. given by Mr. Lamb. He finds the Base of the inscribed Cylinder = 4.358, and its Height = 3.773, making $4.358^2 \times .7854 \times 3.773 =$ greatest Solidity = 56.2795 required ; which should be right according to Proof.

Remark. Mr. James Lamb finds Diam. less Cylinder = 2.9543, and its Alt. 8.208816, making the greatest Solidity 56.26 nearly, being a Second Proof ; shewing that the Question is ambiguous, or admits of Two Answers. By the natural and true Fig. drawn by Mr. Lamb, there are Four sim. Δ s, the Two opposite equal. Whence this Construction. Draw the circumscribing Parallelogram ABEH, with the Base to its Height, as 1 to 2 ; draw BC, HE, for the Two Sections of the outward Cylinder, to contain the greatest Space CDE possible (if these Sections were nearer they would contain less Space, till they coincide). Let \angle BAC = 60° by Quest. Conf. \angle CBA = 30° , now Δ ABC and its Opposite, EDB and its Opposite, are equal and sim. Let AB = 10, and AH = 20, calculate from thence CD and CE and Area CDE ; say, as that Area found 50 : 56.2789, the greatest inscribed Cylinder, so :: CD, DE given to : CD, DE, required. PALLADIUM AUTHOR.

N.B. Mr. Moulsdale, in his Process, says, by a known Theorem, without referring to or proving it ; which is not admissible in mathematical Deduction.

Mr. Dutton of Kinsley, Cheshire, would find the Power of a Towing-Line, of a given Length, tied to the Top of a Boat's Mast ; but does not explain himself.—We refer him to Emerson's Mechanics, when he has de-

H

terminated

terminated his own Meaning, as the only Book of Mechanics extant for Instruction.

By Mr. William Spalton of Renishaw.

To form a short Table, with Observations thereupon, and such as may be easily remembered, so that the Solidity of any Piece of round Timber may be as accurately ascertained, according to the customary Manner of measuring (calling the Fourth of the Girth the Side of the Square) as by either Sliding-Rule or Pen, and with much more Expedition, he sends us as follows :

A short Mensuration Table for Timber.

$\frac{1}{4}$ Girt.	Content 1 F. Len.		$\frac{1}{4}$ Girt.	Content 1 F. Len.		$\frac{1}{4}$ Girt.	Content 1 F. Len.	
In.	F.	In.	In.	F.	In.	In.	F.	In.
7	.	4	20	2	9	33	7	6
8	.	5	21	3	.	34	8	.
9	.	6	22	3	4	35	8	6
10	.	8	23	3	8	36	9	.
11	.	10	24	4	.	37	9	6
12	1	.	25	4	4	38	10	.
13	1	2	26	4	8	39	10	6
14	1	4	27	5	.	40	11	1
15	1	6	28	5	5	41	11	8
16	1	9	29	5	10	42	12	3
17	2	.	30	6	3	43	12	10
18	2	3	31	6	8	44	13	5
19	2	6	32	7	1	45	14	.
						46	14	8
$\frac{1}{4}$ Girth above Feet, Inches 3 or 9.			$\frac{1}{4}$ Girth above Feet, Inches 2. 4. 8. 10.			$\frac{1}{4}$ Girth above Feet, 1. 5. 7. 11.		
Add 1 Foot for every 16 long.			Add 1 Foot for every 36 long.			Add 1 Foot for every 144 long.		

Explanation.

EXAMPLE. Suppose a Tree 20 Feet long, and 18 Inches the $\frac{1}{4}$ of the Girth; required the Content.

In the Table, against 18 Inch Girths, stands 2 Feet, 3 In. the Content at 1 F. Length; which multiplied by 20 Feet, the given Length, gives just 45 Feet for the Answer. So for all other Dimensions. *Except* when the $\frac{1}{4}$ Girth, or Side of the Sq. is 3 or 9 Inches above whole Feet, then you must add 1 Foot for every 16 Feet in Length. When $\frac{1}{4}$ Girth, or Side of the Square, is 2, 4, 6, 8, 10, &c. Inches above Feet, you must add 1 Foot for every 36 Feet in Length. And when 1, 5, 7, or 11 Inches above Feet, add 1 Foot at every 144 Feet in Length.

Remark. There is no more in the above Table than to square the Feet and Inches of $\frac{1}{4}$ Girth, which is done by duodecimal Arithmetic, with a Pen or Pencil, with great Expedition.

EXAMPLE. 17 Inches the $\frac{1}{4}$ Girth = 1 F. 5 In. squared = 2 F. 0 In. 1-12th. So that 144 F. \times 1-12th In. = 144 sq. Inches is another Foot. So the Rest. PALL. AUTHOR.

☞ We must not omit to acknowledge, in this Place, the excellent and improved Method of surveying Gentlemens Estates, and of measuring the Timber growing thereon as it stands, with great Facility and Exactness, by Mr. W. Veck, Land-Surveyor at Colham, near Portsmouth.

NEW ÆNIGMAS.

I. ÆNIGMA 285, by Mr. John Parker of Ashby de la Zouch.

To the Nations of *Europe* I'm very well known,
 From the scepter'd Monarch to *Robin* the Clown ;
 When first I was form'd it does not yet appear,
 But I'm known for my Use for this many a Year.
Cincinnatus knew me and valued me high,
 And for me his Honour and Grandeur threw bye !
 Authentical Records unto you relate
 What Monsters have overturn'd Kingdom and State.
 My Feats you may hear of in City and Town ;
 For often I've turn'd the World quite upside down.
 My Body, in Shape, is triangular found,
 And my Nose, like a Pig's, much inclines to the Ground.
 One Tooth I have got about Eighteen Inch long,
 Which, tip'd o'er with Steel, is remarkably strong :
 My Tooth, you must know, from my upper Jaw goes,
 And hangs perpendicular over my Nose !
 My Arms, like Two Horns, have behind me a Place,
 By which *Robin* guides me with wonderful Grace ;
 And whistles or warbles his amorous Tale,
 In Praise of his Charmer, sweet *Nan* of the Vale.
 My Station oft prompts me my Mother to wound,
 But it is for the Good of my Neighbours around.
 In the Pages of Scripture my Name is inroll'd,
 You'll readily find me—no more needs be told.

II. ÆNIGMA 286, by Mr. Stuchfield of Stepney.

I'm the Ladies Delight, and an Aid to the Fair,
 Whoever has felt me the same will declare ;
 The Scenes I unravel will cause your Surprise,
 O the Raptures I give, when expos'd to your Eyes !
 From the Beggar in Rags to the King on the Throne,
 My Assistance and Friendship are equally known ;
 My Shape's much the same, but with Grandeur I vie,
 And with Rapture or Pain on me both Sexes die ;
 But oh ! in what Ardour the Lover appears,
 When I give him my Sanction to end all his Fears.
 At Weddings strange Things by me oft is display'd,
 And when the young Swain has embrac'd the coy Maid ;
 And what is more strange, at the very same Time,
 When their Friends are at Hand and they think it no Crime ;
 And then I must own I assist in such Works,
 As none would engage in, but Heathens and Turks !
 I'm sometimes, tho' innocent, brought into Scrapes,
 And then I'm Accomplish'd in Lewdness and Rapes.
 Tho' horrid my Crimes, I ne'er yet did repent,
 Because, tho' a Party, I ne'er gave Consent.
 The Parson, the Lawyer, Physician, and Squire,
 For Peace, Rest, and Quiet to me do retire ;
 Sometimes I discover what none ever thought,
 And many fine Frolicks to Light I have brought.

But when *Hymen* (as it sometimes comes to pass)
Both Parties approve, then we meet Face to Face.
My Name is so common, admits of no Doubt,
Palladium Artists, you'll soon find me out.

III. ÆNIGMA 287, by Mr. John Needham of Hinchley, Leicestershire.

More constant than the Turtle Dove,
More beauteous than the Girl I love;
More tawdry than the Drefs of Beaus,
More fickle than the Wind that blows;
What *Ferd'nand* fears amidst the Wars,
What strikes, with Dread, the honest Tars;
What *Byng* once did to save *Mabon*;
What Ladies do when least is done;
What charms us more than Woman can,
What they regard above a Man;
What far excells the mutual K—s,
Now, Ladies, pray unriddle This.

IV. ÆNIGMA 288, by the Rev'd Thomas Vaughan.

In *Lybia* I receiv'd my Birth,
No greater Monster on the Earth;
Men nought expect from me that's civil,
All shun me as they would the D—vil.
I've neither Legs, nor Arms, 'tis true;
Nor Feet, nor Hands, to injure you.
But I've Two Heads, I can't deny,
Which make all People from me fly:
Let not your noble Courage fail,
Each of my Heads is but a Tail!

V. ÆNIGMA 289, by Mr. Ralph Dutton of Kingsley.

As soon as I'm for Business fit,
My Master throws me in a Pit;
And there does plunge me to and fro,
Until a Set of Teeth I show;
In Number oft above a Score,
Which Wood or Stone can't stand before;
When e'er my Work I do come nigh,
I make the very Dust to fly;
I never work but with my Teeth,
Then am I not a hungry Thief?

VI. ÆNIGMA 290, by Mr. Dutton.

Torn from my Mother Earth, by Force tyrannic,
I'm newly modell'd, by a foul Mechanic;
Into a fiery Furnace; then I go,
Like *Shadreck*, *Mesheck*, and *Abednego*;
Once drawn from thence, I, by Man's Art and Care,
Receive the Form which I at present bear;
Now to describe this Form, you may conceive
I chiefly am a Hemisphere concave.
No Eyes I've got, no Legs to strole abroad,
For I ne'er move from my own fix'd Abode.

A Mouth I've got (but ne'er an empty Skull)
Which is not shut but when my Belly's full.
I feed on different Dishes, Eight or Ten,
And eat as much, at once, as twenty Men.
With a long Spoon I'm fed; and be it told,
I'm cram'm'd as full as ever I can hold.
My Stomach loaded, long I can't retain;
But through my Mouth I soon disgorge again.
Oft, undigested, now my Food is seen,
As if a Glutton I had never been.
I, Salamander-like, by Flames am fed;
But stop my Muse—enough's already said.

VII. ÆNIGMA 291, by Mr. Stuchfield of Stepney.

Palladium Artists, attend to my Lay,
And to you I my Properties soon will display.
In Wit, or in Learning, in Wisdom or Knowledge,
I often out-shine the great Dons of the College;
For, in *Latin, French, Spanish, nay Hebrew, and Greek,*
On proper Occasion, I frequently speak.
And as to my Service, a numerous Train
I help to support, and some wholly maintain.
Yet I'm not without Blame; for I cause your Surprise,
When I spread false Alarms, and to fright you tell Lies!
At all Times of Day, I am fondly sought after;
To some I bring Grief, and to others give Laughter!
Without my Assistance the Critic would pine;
For many consult me before they can dine.
The noblest of Passions, that dwells in the Breast,
By what I contain is too often suppress'd.
To me Politicians most ardently flock,
Who prefer my Instructions to *Bacon* or *Locke*.
To the State, 'tis well known, large Revenues I bring,
And attend on the Ladies, the Lords, and the King.
I'm Liberty's Champion, when kept in due Place;
But when I'm abandon'd I suffer Disgrace.

VIII. ÆNIGMA 292, by Mr. Isaac Gumley.

Make Room, O ye Bards, and display your good Nature
For me, your true Friend—a gigantical Creature;
Why mayn't I appear in a Masquerade Dress,
As well as some Others a thousand Times less?
My Uses extend to the Farmer and Clown,
The finikin Ladies, and Beaus of the Town,
Even Princes, that keep their poor Subjects in Awe,
Whose Looks are commanding, whose Words are a Law,
Without Satisfaction and Pleasure would live,
Unblest with the permanent Comforts I give.
By Men of all Parties I'm honour'd and prais'd,
And oft to a Post of Preferment am rais'd;
A Creature so big you but seldom can see,
Edward Bright was a Pigmy compar'd unto me:
My Stature exceeds all the Giants of Yore,
And, when I am mov'd, like a Lion I roar.

Some

Some say I pertain to the feminine Gender,
 Tho' none can affirm I am sprightly and tender;
 Yet with Fashions and Modes I'm not unacquainted;
 For, like the fine Ladies, I'm powder'd and painted.
 Like them, I'm attended wherever I go,
 By a sprightly young Swain powder'd up like a Beau;
 He feeds me and cloaths me—what can he do more?
 And, like a true Lover, lies down at my Door;
 And I, to requite the young sedulous Swain,
 For Favours receiv'd grant him Favours again.
 Now tell what I am to my Friends all around,
 And Fame, with her Trumpet, your Praises shall sound.

IX. ÆNIGMA 293, by Miss Polly Stow.

I'm created by Hymen and die very soon;
 I live but a Month—and in that out of Tune!

☞ We wish that all our ingenious Correspondents would, for the most Part, oblige us and our Readers with *Ænigmas* compos'd on Subjects which are the Objects of *Sense*, *Limitation*, and *Visibility*, and not *mental* or *ideal* Conceptions only; of which latter there is no *Limitation*, or *Possibility* of finding them out. For Instance, if an *Ænigma* were compos'd on *Fortitude*, *Glory*, *Puffillanimity*, *Fallibility*, *Faith*, *Delusion*, *Ecstasy*, *Music*, &c. who would understand the unlimited Metaphors and Descriptions? or cou'd find out the inapplicable Riddle!

☞ Those who send the best versified Answers to the following ÆNIGMA before Candlemas-day have a Chance, by Lot, to win 5, 4, and 3 Palladiums.

PRIZE ÆNIGMA, by Mr. Isaac Gumley, Land-Surveyor, at Countesthorpe, Leicestershire,

Ere Adam rose from his Creator's Hands,
 Or Seas were form'd to separate the Lands;
 Ere Beasts were made, or Herbage taught to grow,
 I reign'd triumphant o'er the World below.
 But now a Prince of far superior Might,
 Displays his Head, and forces me to Flight;
 Where'er he comes I abdicate the Plains,
 And, in my Room, the mighty Conqueror reigns.
 Thus, when great William came to save this Land,
 Assisted by the Omnipresent Hand,
 The Tyrant James before the Hero fled,
 And William reign'd with Justice in his Stead.
 Yet, tho' I from my antient Seat am hurl'd,
 I still extend my Sceptre o'er the World;
 Still am I own'd a most benignant Lord,
 For unto all I some Relief afford.
 When I retire, how many Lovers mourn?
 And wish, with anxious Heart, for my Return!
 With eager Eyes, the hardy rustic Swains
 Behold me come serenely o'er the Plains,
 With joyful Hearts they sacrifice to me,
 And I proclaim a general Jubilee.
 The Nobles too rejoice to see me come,
 And Mirth and Music shakes the lofty Dome;

The mitred *Priests*, and valiant Men of War,
Extol me much, and hail me from a far;
The *Monarch* who surrounding Realms adore,
Whose pow'ful *Deeds* are sung from Shore to Shore,
Must own that I'm superior in Renown,
For, when I reign, he lays aside his Crown.
Now, gentle *Bards*, that pant for honest *Fame*,
Come trace me out, and tell the World my Name.

NEW QUERIES.

I. QUERE 263, by Mr. G. Simkin of Finedon.

In what *Place* do Birds generally make their natural *Exit*? Experience shewing that very rarely any Kind of Birds, great or small, are found *dead*, unless they are wounded by *Sportsmen*, or otherwise destroyed.

II. QUERE 264, by Mr. R. Parnel.

Why the *Weather* is colder in *North America* (as Travellers report) than with us in *England*, in the same Parallel of Latitude?

III. QUERE 265, by Mr. Parnel.

Why the Wind blows colder from the *East* than from the *West* Point of the Compass, in *England*?

IV. QUERE 266, by Mr. Parnel, addressed to Miss Stow.

What will the Number of *Direction* be (as 'tis called) when the *Golden Number* (or Moon's Cycle) is 19, *Epaet* 20, and *Roman Indiction* 4?

V. QUERE 267, by Mr. Dutton of Kingsley, Cheshire.

To explain the natural, but wonderful *Operation* and *Effects* of Thunder and Lightning.

VI. QUERE 268, by Mr. Dutton.

Whether a *Scent*, or *Smell*, diminishes the Substance from whence it arises?

VII. QUERE 269, by Mr. Dutton.

To explain how the Length of a *Wire*, or *Pendulum*, is varied by Heat or Cold, in the same or different *Climates*?

VIII. QUERE 270, by Mr. Dutton.

How is the *Sparkling* (or *Twinkling*) of the Stars, or of a Diamond Ring upon a Lady's Finger, accounted for?

IX. QUERE 271, by Mr. Dutton.

To explain the Nature of *magnetical* Attraction, and the Variation of the *magnetical* Compass?

X. QUERE 272, by Mr. George France.

The Sound of a *Viol* or other musical Instrument after the *Stroke*, or String swept by the Stick, may be rationally attributed to the Friction of the Strings, and by their keeping in Motion after being struck by the *Plectrum*. But as this cannot be the Case with the Toll of a Bell, it is required to determine the adequate Cause, whence a Bell continues it's Sound, for such a considerable Time after being struck by the *Clapper*?

The

The following additional QUERIES by a VIRTUOSO.

XI. QUERE 274.

How the First human Pair acquired articulate Speech or Sounds for communicating their Ideas? it being easy to account for how succeeding Generations of Men learned the various *Languages* of those who lived before them.

XII. QUERE 275.

Whether the First Song of the First Species of Singing Birds, was not derived from *Instinct*, by which the young Broods of different Species of all Kinds of Birds differently build their Nests, like their respective *Predecessors*, without being taught?

XIII. QUERE 276.

Whether a Nestling Singing Bird, taken from it's Parent Birds when but a Day or Two old, and brought up by being hung near several Cages of different Kinds of Singing Birds, would not acquire a Confusion of Notes in its Song?

XIV. QUERE 277.

Whether a Nestling Singing-Bird, taken from it's Parent Birds as soon as it can live without them, and brought up at a Distance from hearing all other Kinds of Singing Birds, would sing with the Parent Notes? or what Properties, in *Call*, *Recording*, and *Singing* would that Bird acquire, being bred under the Hearing of Man only?

XV. QUERE 278.

Whether many Kinds of Birds (like *Parrots*) might not be taught articulate Sounds, being kept from hearing the Notes of their own or any other Species?

XVI. QUERE 279.

Whether the Song of the same Species of Singing Birds might not be still varied by being educated among still different *Songsters*?

XVII. QUERE 280.

What Sort of a Being would Man himself be, being bred up from his Infancy in a retired Place, at a Distance from the Rest of the human Species, and from seeing the Variety of sensible Objects in Nature? Whether his Organs formed for different Purposes and Improvements (especially those of *Sight* and *Hearing*) would be affected as they were at first, when admitted to hear Sounds and see Objects, after his being grown up to *Maturity*?

XVIII. QUERE 281.

Whether it is the more eligible for a Person grown up, or in Infancy, to part with the *Sight*, or *Hearing*?

The differently *variegated Plumage* of Birds, the various Spots of Horses, Dogs, and other Animals, and amazing and beautiful Variegation of Flowers, are no more to be accounted for than the surprizing Forms, Modifications, and Colours of all the different Sea and Land Animals, Vegetables, Shells, and Fossils: being the *wonderful Works of the Creator*!

NEW REBUSES.

I. REBUS 263, by Mr. Thomas Wood of Stoke-Golding, Lincolnshire.

Four *Initials* combine, or properly join,
 Of th' *four Cardinal Points* so well known;
 They'll exhibit you quick, what is *new* once a Week,
 And what pleases most People you'll own.

II. REBUS 264, by Mr. Thomas Wood.

Worthy *Artists* attend, your *Patience* suspend,
 In most *Concerts* of Music I'm heard;
Direct or *reverst*, of Five Letters posselt,
 I please those most who me regard.

III. REBUS 265, by Mr. G. Simpkin of Finedon.

A *Month* of the Year, and *Nothing* when join'd,
 Will exhibit a *Lass* of the beautiful kind.

IV. REBUS 266, by Mr. Simpkin.

Five Hundred and Nine, and Two-thirds of *One*,
 Connected will name a Nymph blooming and young.

V. REBUS 267, by Mr. W. Turner of Witney, Oxfordshire.

To Three *Fourths* of what's *boasted*, at voting, in vain,
 Add the *Name* that's applied to the Teeth when in Pain,
 Will a worthy *Squire's Name*, in *Wiltshire*, explain. }

VI. REBUS 268, by Mr. W. Turner.

That *Root* that we eat in the Spring as soon as grown,
 That hard working *Artist*, employ'd much at Home,
 Where in *Herefordshire* R begins a fair Town,
 Shews three famous *Actors* of Rank and Renown.

VII. REBUS 269, by Mr. W. Turner.

To a *Talent* that *Blockheads* can never come nigh,
 Add the First of *Nobeing*, Two Thirds of an *Eye*,
 And an *Oxfordshire-Town* fam'd for Commerce you'll spy. }

VIII. REBUS 270, by Mr. Turner.

To Three *Fourths* of a *Hurt* got by Fire,
 Add a *Passenger's Way* thro' a Stream;
 You'll a Town see in fam'd *Oxfordshire*,
 Well known, for it's Commerce, by Name.

IX. REBUS 271, by the Rev. Thomas Vaughan of Morpeth.

What the *Protestants* hate, and the *Papists* desire,
 Is the Name of a *Poet* all Poets admire!

X. REBUS 272, by Mr. W. Marsden of Netherhurst, Derbyshire.

To Two Thirds of a *Thing* that the Head does surround,
 Add a *Note* which in Music was formerly found;
 With these a *Male Child* must be plac'd quite behind,
 And what is *delightful* to hear you will find.

NEW PARADOXES.

I. PARADOX, by Mr. Thomas Smith of Lamberhurst, Kent.

One Point of the Compasses may be fixed so,
When the other turns round an Ellipsis will show.

II. PARADOX, by Mr. W. Penn of Chalfont.

For 6d. per Pound, as I've heard People say,
A Parcel of Goods was once bought at Bearkey;
And then sold for 5d. per Pound the next Day.
Ten Pounds sterling Money was gain'd by the Sale,
Which Way could this happen, be pleased to reveal.

III. PARADOX, by Juvenis.

On three certain Days, in each Month * of the Year,
The Moon neither rises, souths, sets—I can make it appear.

* At a certain City in England.

IV. PARADOX, by Miss Polly Stow, addressed to Mr. Isaac Gumley of Countesthorpe.

Two Months and Six Days, for his Lodgings, A paid,
Two Months and no more, to pay for, B had;
Each paid the same Price, by the Month, as the other,
Yet both paid alike—how happened this, Brother?
I mean Brother Batchelor, (think it no Evil)
If you'll do me this Favour, I will be as civil.

V. PARADOX, by Miss Stow.

A Petticoat-Piece I've bought by the Ell,
(Tho' the Yard's common Measure had done full as well)
Two Ells I've in Length, and Three Breadths in't I find;
With ten Yards square, Flannel, I'd have this full lined.
If I manage it well, perhaps 'twill make two*; * Underlined.
Let us see what our Cutting-Contrivance can do!

VI. PARADOX, by Mr. Swift of Stow, Lincolnshire.

In the Fens I can ride Sixteen Hundred Poles an Hour;
In the Forests I have found that far less is in my Power.

NEW QUESTIONS.

I. QUESTION 607, by Mr. William Penn of Chalfont, Bucks.

What Number of Stones are required to be placed in a Right Line, One Yard from each other, and picked up by a Person One at a Time, and all to be conveyed by him to One Heap, at the First Stone, so that, in performing it, He may travel the nearest Distance to Twelve Miles; what will be the Number of Yards he travels?

II. QUESTION 608, by Mr. Penn.

An equilateral Triangle's Area is known to be,
When inscribed in a Circle, just 103;
The Area of each Segment, I wish you wou'd find,
By a Method the shortest?—if you'll be so kind.

III.

III. QUESTION 609, by-Analyticus.

Given $\begin{cases} x^2 + xy + yy = 49 = a \\ x^4 + x^3y^3 + y^4 = 4081 = b \end{cases}$ Required the Value of x and y , by the lowest Equation?

IV. QUESTION 610, by Amelia of Derbyshire.

Given $\sqrt{x^4 - x^2}^2 + \sqrt{x^2 + x}^2 + \sqrt{x^2 + 1}^2 - x^7 = x^3$. Required the Value of x by Quadratics?

V. QUESTION 611, by Mr. Ralph Dutton of Kingsley, Cheshire.

Required the Length, Breadth, and Height of a rectangular House, to contain the greatest Room possible; being built with 100000 Bricks, of 9 Inches long, 3 broad, and $1\frac{1}{2}$ thick; and the Walls 15 Inches thick?

VI. QUESTION 612, by Mr. J. Cartill of Walkington, Yorkshire.

Required the next Year forward when the Dominical Letter will be E, Golden Number 15, and Lunar Epact 4.

VII. QUESTION 613, by Mr. Dutton.

If a Boy can shoot an Arrow, out of a Cross-Bow, 100 Yards in a vertical Direction, required the greatest Distance that the same Boy can shoot the same Arrow, from the same Place, by applying the same Force?

VIII. QUESTION 614, by Mr. Alexander Row of Reginnis, Cornwall.

Given the Area, Base, and Difference of the Legs of a Right-lined Triangle, to determine its Sides?

IX. QUESTION 615, by Amelia Derbyshire.

Required to determine the Method, that One of the Two Players, at the Game called *Thirty-One*, must take, by Thought, so that he may (if possible) always win in the Three following Cases:

1. To take any Number under 7, as often as either of them shall think proper.
2. To take no One of the said Numbers above Three Times over.
3. To take but One Six, Two Fives, Three Fours, Four Threes.

X. QUESTION 616, by Mr. William Pen.

A circular Island is 71 Miles round; and Two Travellers, A and B, depart both from One Place, at the same Time, in the Circumference; A travels 50, and B 40 Miles each Day, each the contrary Way to the other, quite round this Island. A Third Person, C, starts with A and B, and goes across the Island's Diameter, at the Rate of 1 Mile the First Day, 2 the Second, 3 the Third, 4 the Fourth, more by One Mile each Day than on the former. How far will C be from A and B, when they first meet? and whether C will be coming from, or going towards A and B? and how many Miles will each have travelled when A and B first meet at the Place they set out from?

XI. QUESTION 617, by Mr. John Lynn of Sunderland School.

To enscribe a Square in the Quadrant of an Ellipsis, if you join the Extremities of the Semiconjugate and Semitransverse Diameters, and let fall a Perpendicular upon the Hypothenuse of the right-angled Triangle from the

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Center of the Ellipsis, then where the Perpendicular let fall cuts the said *Hypothense*, joining the said Extremities of the Semitransverse and Conjugate Diameters, the *Distance* from the Center of the *Ellipsis* to where the Perpendicular falls, will be equal to the Side of the *inscribed Square* in the said elliptic *Quadrant*. Required the Demonstration of this curious *Proposition*.

XII. QUESTION 618, by Mr. Thomas Robinson of Biddick.

There is a *Hollow Globe* of Copper, whose concave Axis = 24 Inches, and the Copper's Thickness = $\frac{3}{4}$ of an Inch. This Copper Globe being tied by a String to a Globe of Cork, and thrown into common Water, then $\frac{2}{3}$ of the Cork will emerge. Required the Diameter of the Cork Globe?

XIII. QUESTION 619, by Mr. Cartill of Cottingham, near Walkington, Yorkshire.

From a Point in a *Horizontal Line* are drawn upwards, two Sides of an oblique Triangle, 45 and 39, respectively; with an Angle included between them of 88° : required the *Position* of the said Triangle, in respect of the said *Horizontal Line*, so that *Perpendiculars* being let fall from the two Extremities of the said triangular Sides drawn upward, as aforesaid, from the said Point in the *Horizontal Line*, shall form two exterior right-angled Triangles with the *Horizontal Line*, whose inscribed Circles shall be equal.

XIV. QUESTION 620, by Mr. William Marsden of Netherhurst, Derbyshire.

A musical *WireString*, 40 Inches long, weighing 32 Grains, being stretched by 8 Pounds Avoirdupois Weight, sounds *Unison* with the lowest String of the *Base Viol*. To determine, from thence, the Number of *Vibrations* each String will make in One *Second* of Time: the Strings being C, G, D, and A; each a *Fifth* above the other, respectively.

XV. QUESTION 621, by Mr. John Shadgett of Ross, Herefordshire.

Given the Base, and Perpendicular of a right-angled Triangle, x^x and x^{x-1} respectively, and the *Difference* of it's Area, and the Area of it's Circumscribed-Circle = 46496.9728 square Inches: Required, from thence, the separate *Dimensions* of this Triangle?

XVI. QUESTION 622, by Mr. Jos. James of Stoke Bishop, near Bristol.

Given the *Transverse Axis* of an *Ellipsis* = 60 Inches, and the Conjugate = 40 Inches: Required, from thence, the *Content* of a Cone, inscribed therein, whose *Curve Superficies* shall be a *Maximum*.

XVII. QUESTION 623, by Mr. William Sherwin of Ashton upon Trent, Derbyshire.

Given the *Radius* of a Circle = 10, and a *Tangent* drawn to the same = 50, to determine the *Sides* of the greatest *Parallelogram* that can be inscribed in the Space contained between the said *Tangent*, the *Curve*, and the exterior Part of the *Secant*, from the Circle to where it meets the said *Tangent*.

XVIII. QUESTION 624, by Mr. William Sherwin.

Given $\left\{ \begin{array}{l} y^8 x^4 + y^2 x^4 - y^4 x^2 = 4032.25 \\ x^2 y^6 + y^2 = 16640x^4 \end{array} \right\}$ Required the Values of x and y , by a *Quadratic Equation*?

XIX. QUESTION 625, by Mr. Veck, Land-Surveyor at Cosham near Portsmouth.

Three Friends, A, B, C, bought a *Cheese* very dear,
 It's *Breadth* to it's *Depth*, just as 5 to 1 were;
 It's *Breadth* 15 Inches; *Price* Eight and Six Pence.
 Each paid more than other one Shilling Expence.
 How was this *Cheese* cut, into Shares, || let me see,
 By Two parallel *Cords*, for my Friends A, B, C?
 And what I ask more—be pleased to expound,
 How much did this *Cheese* cost my Friends by the Pound?

N. B. We had an inconsistent Question of this Sort sent us, in *Prose*, of a *Cheese* of the same Diameter as *Depth* = 16 Inches, that cost but 6s. 8d. being but about 1d. per Pound; which *Impropriety* we therefore omitted.

XX. QUESTION 626, by Mr. William Veck.

Required a general practical Rule, with a correct and easy Method, to measure the Quantity of Timber, as it stands growing, upon Estates?

XXI. QUESTION 627, by an Engineer.

Required the nearest Ratio of the Diameter of the Bore to its Length, of a Piece of Ordnance, to carry the Shot the farthest possible, so as to have the greatest Effect, or Force possible, upon an Object at the same Distance?

XXII. QUESTION 628, by Mr. William Veck, Land-Surveyor at Cosham near Portsmouth.

Given the Length of a horizontal Beam, $4\frac{1}{2}$ Yards, a regular Piece of Timber, in Form of a Parallelopipedon, $3\frac{1}{2}$ Yards long (of equal Depth and Breadth) which is suspended by Two Cords of 3 and $2\frac{1}{2}$ Yards long, respectively, the Cords being fixed to the Ends of the said horizontal Beam, and also to the Ends of the said Piece of Timber, forming between them a Tropazium. Required, from thence, the Position the said Piece of Timber rests in, so suspended, or the Angle it makes with the Horizon, by an Equation of the lowest Dimensions?

2dly, If the said Piece of Timber were in the Form of a Cone of the same Length, $3\frac{1}{2}$ Yards in its Axis, and the Diameter of its Base 2 Feet, suspended by the same Lengths of Cords, from the Vertex, and the Circumference of the Cone's Base. Required, from thence, the Position of the Cone's Axis with the Horizon?—As Mr. Dutton prefers mechanical Disquisitions to all others, he will have an Opportunity of exercising his mechanical Talents upon this Question.

XXIII. QUESTION 629, by Mr. Ralph Dutton of Kingsley, Cheshire.

There is a Leaver of sound dry Oak, the Side of whose Square = 6 Inches; it has a Weight suspended at the shortest End = 56 lb. and there is a Prop fixed under the Leaver, at 8 Inches Distance from the Weight. Required the Length of the other End of this Leaver, bringing the said Weight to an Equilibrium?

XXIV. QUESTION 630, by Mr. George Eyre of Castleton, Derbyshire.

The perpendicular Height of a Wire = 24 Inches, erected as a Gnomon to the Plane of a large horizontal Sun-dial, in Latitude 20 Degrees. To determine, in the Afternoon of that Day, when the Sun is in the Tropic of Cancer, how many Degrees the Shadow of this perpendicular Gnomon will

will go eastward, from the South, to which it points at Noon, before it goes back (like the Shadow of the Dial of King *Ahaz*, mentioned in Scripture) towards the South again?

And, if there be two musical vibrating Strings (differing only in Length) whose Lengths are as the Ratio of the Cube Roots of the Shadow's Length of the Gnomon at Noon, and of that Shadow pointing most easterly, on the said tropical Day.—Required, from thence, the Numbers, or Ratio, that will express the Interval of Sound of the said Two vibrating Strings?

XXV. QUESTION 631, by *Miss Polly Stow*. Addressed to *Mr. George Eyre of Castleton*.

On the Fifth Day of *May*,

What's the Time of the Day?

When Latitude, † Altitude, Azimuth ‡ are † North.

All equal each other, fam'd Artists declare? ‡ From South.

And if you expect I shou'd grant you a Boon,

Tell me, by the Sun, whether fore or past Noon?

Whoever sends Answers to the following Question before the Beginning of *April* will be intitled to the Reward of 12 *Prize-Palladiums*.

Analytical PRIZE-QUESTION, by *Mr. Rowland Witherald of Bishops-Wearmouth*.

The aliquot Parts of the Two Numbers 220, and 284, are such, that the Sum of the aliquot Parts of either of these Numbers is exactly equal to the other Number. For the aliquot Parts of 220, are 2, 4, 5, 10, 11, 20, 22, 44, 55, 110, 220, producing, by Division, 110, 55, 44, 22, 20, 11, 10, 5, 4, 2, 1; whose Sum = 284. And the aliquot Parts of 284 are 2, 4, 11, 141, 284, producing, by Division, 142, 71, 4, 2, 1, whose Sum = 220. Required, by a General Rule, to find all the like reciprocal Pairs of Numbers contained in 859 Octillions, so that the Sum of all the aliquot Parts of each Number of each Pair shall be equal to the other Number?

THE DULCE DOMUM; sung by the SCHOLARS of *Winchester School*, or *College*, at the BREAKING-UP.

Written about 200 Years since by a *Winchester* Scholar, detained at the usual Time of Breaking up, and chained to a Tree or Pillar, for his Offence to the MASTER, when the other Scholars had Liberty to visit their respective Homes, while the Breaking-up lasted. Which confined Scholar was so affected with Grief, by being thus detained from seeing his dear Home, and for the Loss of his Liberty, that he was passionately moved to write his distressful Sentiments of Anxiety, on finding himself deprived of the Sight of his Friends, like the Rest of his School-Companions. That, calling to Mind the Loss of all the beloved Objects of his Happiness, he died, broken-hearted, before his Companions returned.

In Memory of this unhappy Incident, the Scholars of *Winchester School* have an annual Procession, and walk round the Pillar or Tree three Times, to which their Fellow-Collegian was chained, before the Procession ends: singing all the time, as follows.

DULCE

DULCE DOMUM.

1. Concinamus, O Sodales,
Eja! quid silemus?
Nobile canticum,
Dulce melos, Domum.
Dulce Domum refonemus.

CHORUS.

*Domum, Domum, Dulce Domum,
Domum, Domum, Dulce Domum,
Dulce, Dulce, Dulce Domum,
Dulce Domum, refonemus.*

2. Appropinquat ecce! felix
Hora Gaudiorum,
Post grave tedium
Advenit omnium
Meta petita Laborum.
Domum, Domum, Dulce Domum, &c.

3. Musa! Libros mitte, fessa;
Mitte pensa dura,
Mitte Negotium,
Jam datur Otium,
Me mea mittito cura!
Domum, Domum, &c.

4. Ridet Annus, prata rident,
Nosque rideamus,
Jam repetit Domum,
Daulias Advena:
Nosque Domum repetamus.
Domum, Domum, &c.

5. Heus! Rogere, Fer caballos;
Eja nunc eamus,
Limen amabile,
Matris et Oscula,
Suaviter et repetamus.
Domum, Domum, &c.

6. Concinamus ad Penates
Vox et audiat;
Phosphere, quid Jubar,
Segnius emicans,
Gaudia nostra moratur?
Domum, Domum, &c.

TABULA LEGUM PEDIGOGICARUM, apud Scholam Wintoniensem.

In Templo.

Deus Colitor
Preces
Cum devoto Animi affectu
Peraguntor.
Oculi non Vagantor
Silentium esto.
Nihil profanum legitor.

In Schola.

Diligentia quisque utitor
Submisso loquitur Secum,
Clare ad Preceptorum.
Nemini molestus esto.
Orthographicè scribito.
Arma Scholastica
In promptu semper habeto.

AD PALLADII AUCTOREM.

Domine,

Ut Amicus Eruditioni, ut Amator Scientiæ
Ludimagister, bonarum Artium Doctor, portionem
Laudis accipe non minimam, nec adulator, si Flacco
Conclamo, dignum Laude Virum, Musa velat mori.
Profitetur me tunc Servum esse,

Mense Aprilis,

Die 13^o, Anno Christi 1777.

GULIELMUS TURNERUS,

Witney, Comitatu Oxoniense.

MORAL OBSERVATIONS.

FOR SCHOOLS AND ACADEMIES.

OF PROMISES AND NON-PERFORMANCES.

1. He that is true to his Word has the Advantage of being always credited, and esteemed for it.
2. He that disregards and forfeits his Word is always disregarded and disesteemed, as One who is unworthy of Trust.

3. When

3. When a *Man* is known to be false to his Word, he is looked upon as One of the floating Islands, mentioned by Historians, seen to Day and carried to Morrow we know not whither. Instead of expected Earth to build or inhabit on, nothing is found but deceiving and inconstant Waves.

4. When a *Man* is *punctual* in the Performance of his Promises, it renders him respectable, till he becomes divine; having the Honour, that *not a Tittle of his Word falls to the Ground*.

5. A Man of Promise and Performance is like a Sheet Anchor on which his Neighbours and Friends depend for Safety: who is also their *Altar*, they fly to and rely on.

6. A faithful Promise is both a Shield and Buckler, and a sure Guard both in the Rear and Van of human Affairs: under the Cover of which we may march with Safety, shielded from the Bickerings and Ambushes of our Adversaries.

7. But a Man of false Promises, instead of being a Pillar, for a Prop of others to rest on, will prove to be only a deceitful Reed to lean on.

8. It was therefore a false Maxim of *Domitian* the Emperor, when he said, that he, who would gain the People of *Rome*, *must promise all Things and perform Nothing*.

9. *Henry* the Fourth of *France* was so different to this Emperor, and so exact in the Performance of the Punctilios of his Promises, that it raised him to the exalted Name of being called *The King of Faith*; rivaling all the *French* Kings, in that Honor, ever since.

10. A faithful Performer of his honest Word, is like a *Bridge* that carries us over Torrents and Rivers; or like the *Ship* that conveys us safe over a tumultuous Ocean, amidst the beating Waves and boisterous Winds, to the Port of our Business and Affairs.

11. To be *faithful* to one's Promise shews the Man to be just. He that is so, 'tis beneath Him to do *any Thing*, that shall carry in it *Disappointment*, or any *Injury*, to darken his Reputation.

12. *Fidelity* is the Patron of other *Virtues*, which Men are so much cried up for in the World.

13. *Truth* and *Fidelity* are the grand *Pillars* of the *Temple of the World*: If these should fail the *Fabric* must fall and crush all into Ruins.

14. He that has acquired the Reputation of a *just Man*, has no Difficulty to struggle with but what he can easily overcome. It saves him the Trouble of a *Security*, who is his own bound *Surety*; when Men of ill *Principles* are refused *Security*, in their Danger of *Bankruptcy*, and greatly at a Loss to find *Any* who will be concerned with them.

15. When a *Man* hath not wherewithal of his own to trade with, through Losses that may happen, or *otherwise*, yet if he has been found ever just and punctual to his Word, in acquitting his Obligations, as far as lay in his Power, and never offered *Deceit* to any, his own Credit and Reputation will be a *Stock* sufficient for his *Resettlement*, and for raising him up again in the World. The Repute of his *Justice* and *Integrity* will not fail to give him a *Command* over other Mens Possessions.

16. A *Prince* always gains by being *just*. Subjects being under such a *Ruler* will support and defend Him with their Wealth, Councils, and Force of Arms, to the utmost of their Power, against all his Enemies; whose *Interest* it is so to do; because they are every one concerned, in the same united *Interest*, in having a *just Ruler* over them, detesting to offer them any *Injury*, or *Vexation*.

17. A *Man*

17. A *Man*, who breaks his *Word*, teaches others to be as false to Him. Those who are too *just* to be so, he may leave them in Anger at being deceived, while the *Shame* and *Infamy* fall on Himself.

18. When *Alcibiades* met the renowned *Socrates* at a Feast, he could not help blushing, and was constrained to confess, *That he was ashamed at not having performed his Promise to Him.*

19. When a *Man* promises his Performance is expected; if he fails in it, it throws on the promised Person a high *Indignity* and *Disappointment*; and instead of a *Blessing* it throws upon the *Promiser* a *Curse*!

20. But some *Men* regard their Promises as little as *Dionysius* the Tyrant (being much of the same *Principle*) when he cast a pitiful Jest upon a *Harper*, who playing excellently before him, assured him of a great *Reward*; but when his Playing was over, he told him, *So long as you pleased me with your Playing, so long were you pleased with the Hopes of a Reward*; and sent the *Harper* away without giving him a Farthing.

21. It may happen many Times, that a *Man's whole Stock* of worldly *Consolation* may depend upon a *Promise*; which being unperformed, his *Anchor* of Hope, that he depended upon, is lost, and he is left a *Wreck* to the boisterous Winds and Waves of *Adversity*. The anxious *Disappointment* oft-times removes a *Man* from the *Benignities* and Prospects of his Pleasures, and depresses him to the Horrors of a sad *Defeat*, and may compel him to a *Desperation* of very fatal Consequences.

22. The *Man* who falsifies his *Word* never, wisely, consults his own Safety.

23. He who contributes to, or puts another upon, the *Violation* of his *Word*, at the same Time robs him of his *Honor* and *Integrity*; and consequently becomes his very great Enemy. When these noble *Qualities* are forfeited, which are the royal *Ensigns* of Humanity, no *Reverence* will be paid; but the *Party* disrobed of them will be *naked* or disguised, and exposed to the Contempt and Scorn of all worthy Men.

24. Upon the Rock of *Promises*, the *Brave* build their Hopes; if that *Foundation* fails the Structure is destroyed.

25. When I pass my *Word*, I give my Friend the *Food* of Hope to subsist on. If I fail in my *Word*, I feed him with a *Lie*; which must be very *unpalatable* to him, and *shameful* to myself.

26. The *Antients* so much hated *Breach* of *Promise*, that they wished it as a *Curse* on their Enemy, that they might, by such *Baseness*, put themselves from under the Protection of Heaven: for when *Tissaphernes* had broken the Truce he had made with King *Agésilas*, this King sent Ambassadors to thank *Tissaphernes*; since by breaking his Faith, or *Promise*, he had made the Gods his Enemies.

27. *Regulus*, the stout Roman General, being overthrown, and taken Prisoner by the *Carthaginians*, having passed his *Word* to return, if he could not obtain their Demands of the Roman Senate, and not being able to do it, he, for the Sake of his voluntary *Promise*, returned to *Carthage*, and suffered a cruel Death; by which he acquired immortal Fame and Reputation to all Posterity.

28. The Breaking of *Promises* may well startle all these, whose Consciences are not asleep; since all the *Stress* of Life depends upon fulfilling them.

29. The *Salvation* of the World depends upon the *Promise* of the *Messiah*; and if that *Promise* should fail the *Christian* World has no other Surety.

30. That, since as all *Promises* run in a *Parallel*, in a higher or lower Degree, as they are of greater or less *Concernment* to human Welfare and Happiness, therefore Men should be wary and careful of keeping their Words, and observe to be *slower* in making *Promises* and breaking them.

31. It is no Shame, in *Reason*, to refuse making a *Promise*; but when once a *Promise* is made, it is an egregious *Shame* and *Injury* not to fulfil it.

32. He that cheats his Friend, by *Promises*, or otherwise, blasts his own Reputation, and gives his Enemies an Advantage to triumph over him.

33. He that loosely or doubtfully *promises*, as if a Matter of slender Consequence, and therefore is negligent of performing what he has so indifferently promised, involves himself in more *Snares* and *Vexations* than he oft-times can, without great Difficulty, if at all, extricate himself from with Safety.

34. *Promises* may procure Friends; but not performing them, through Neglect, will soon change them into Enemies. For when Friends are obtained by *Promises*, *Performances* only can cherish and preserve them, or the *Cement* first combining them will be dashed and dissolved, and leave Friendship in a worse Condition than ever.

35. When Men of unjust dishonourable *Principles* make *Promises*, without Design of performing them, they may be considered as the *Promises* of a Set of *Deceivers*, assuming to be, in Trade, *Gentlemen*, whose Words are not to be taken on any Account whatsoever, because (like *Gentlemen Gamblers*, *Swindlers*, *Takers-in*, &c.) they live by lying; while they can put off one Customer, first intitled, by *false Promises*, *Protestations*, and Pretences, to be served (at a *Loss* or *Disadvantage*) to serve another more profitable.

PAL. AUTHOR.

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Why will Offenders boast their Shame?

And why some Men deny their Name?

Why practise Falshood in Disguise?

Why honest Truth neglect for L—s?

Why Promises will disregard?

Why Others Interest will retard?

Why some ne'er act by moral Rules,

But act the Part of K—s and F—ls?

Answer.

Because they ne'er were us'd to Good,

And never acted as they shou'd;

But like Old-Nic, grown quite case-harden'd,

Who, doom'd to H—ll, can ne'er be pardon'd.

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